Gas Journal

VOL. 285. 108th YEAR. LONDON, FEBRUARY 1, 1956. Nº 4835. PRICE 1/6

THOMAS GLOVER & Co Ltd

THOMAS GLOVER

& COMPANY LIMITED

Gothic Works, Angel Road, Edmonton, London, N.18 and Branches

TG 21

FIG. 150

modern H.P. design

Double-faced Modern H.P. Design. Corrosion Resisting Steel Door. Special Resilient Non-Metallic Composition Seats. Self-Lubricated. Seats enclosed and protected from Dust and Dirt in both Open and Closed Positions. Simple and Robust in Construction. Positive in operation. No Internal Operating Mechanism exposed to Gas Stream. No Wedges or Springs. Cannot Jam—Open or Closed. Spindle can be Repacked in the Open or Closed Position. Standard Test Pressure 100 lbs. per Sq. In. Air. Internal or External Screw with or without Indicator. Can be Adapted for Under-Pressure Connections. A High Pressure Valve at a Low Pressure Price. Sizes 3" to 24" Horizontal and Vertical.

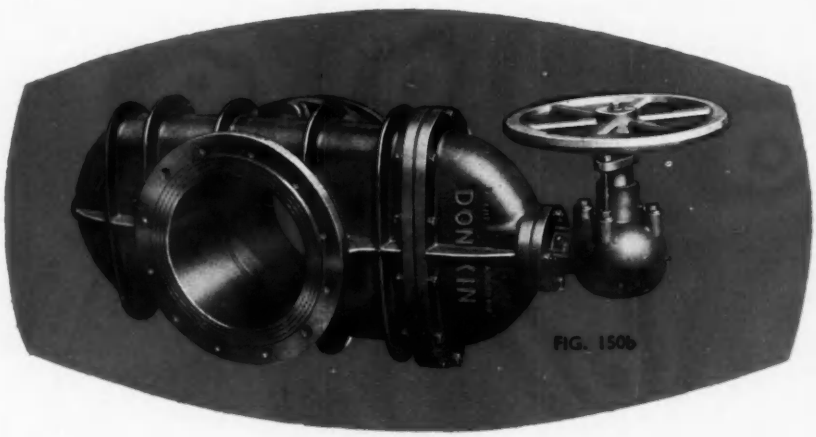

FIG. 150b

THE DONKIN VALVE

THE BRYAN DONKIN COMPANY LIMITED

CHESTERFIELD · (TEL : 3153) · LONDON

Makers of Gas Valves for over 100 Years

MBVA Member Valve Manufacturers Association

The Society of British Gas Industries · 1905 ·

BY-PRODUCT PLANT

WELDED STEEL BENZOLE SCRUBBERS AND COOLER

supplied to the order of Woodall-Duckham Construction Company Ltd. at the Stanton Ironworks

AMMONIA CONCENTRATION

We also design and make plant for:—(a) a concentrated gas liquor product, and (b) a pure ammonia product.

The compact design of these plants is based on our long established tradition in this field and sound technical approach; special attention being paid to low steam consumption, automatic control, and general ease of maintenance.

Your enquiries and orders will be welcomed by:

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DEMPSTER

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Constructional Gas & Chemical Engineers

GAS PLANT WORKS · NEWTON HEATH

MANCHESTER · 10

London Office: 34, VICTORIA STREET, S.W.1.

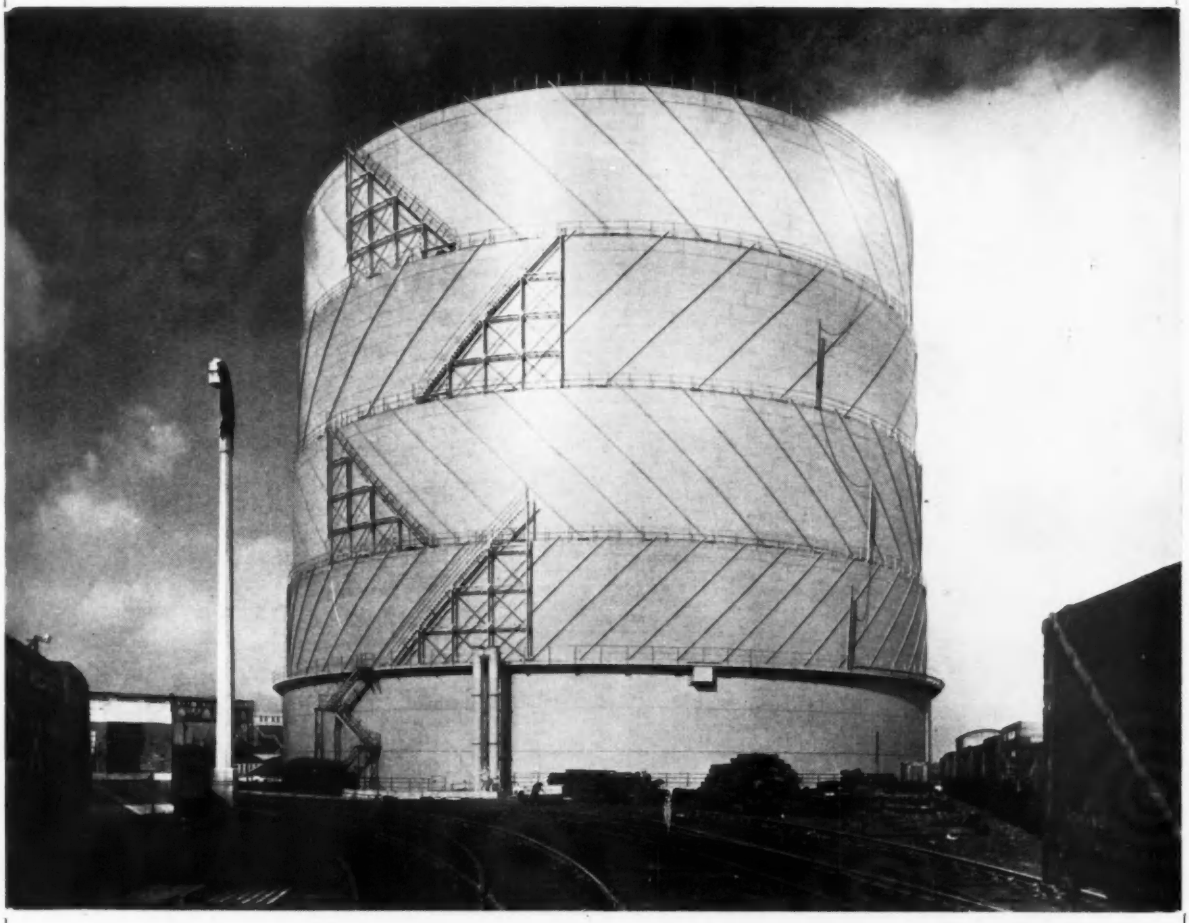
We make:—BY-PRODUCT and CHEMICAL PLANT · CONDENSERS · DETARRERS · GAS CONNECTIONS and VALVES. GASHOLDERS · IRON CASTINGS · PURIFIERS · STILLS · TANKS . WASHERS · WELDED and RIVETED STEEL WORK

A

FIVE MILLION

CUBIC FEET CAPACITY

GASHOLDER and STEEL TANK



COMPLETED MAY 1953 AT

SWAN VILLAGE GASWORKS

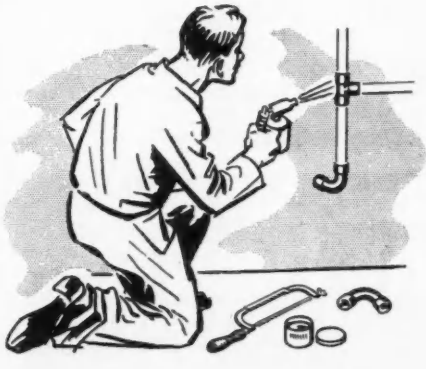
BIRMINGHAM DIVISION, WEST MIDLANDS GAS BOARD

CLAYTON SON & CO. LTD.
HUNSLET LEEDS YORKSHIRE

The *strongest* joints . . .

are made quickly and more easily

with IDEAL *Full-way* FITTINGS



They are tinned throughout and ready for immediate use. Therefore no cleaning is necessary and no time is wasted by having to scour with steel wool on the inside to prepare them for solder.

They are unaffected by extreme temperatures and provide free, unrestricted flow, as the internal diameter of the fitting is the same as that of the tube, thus ensuring a uniform bore throughout.

They are uniform and interchangeable, and are manufactured for use with light gauge copper tube to Nos. B.S.S. 659 and B.S.S. 1386.

In heating, plumbing or gas pipe-lines, the perfect *joints are secured by Ideal* Full-way *Fittings.*

MANUFACTURED BY IDEAL BOILERS & RADIATORS LTD., IDEAL WORKS, HULL

IDEAL-Standard

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CONSETT

HIGH GRADE REFRACTORIES FOR COKE OVENS, GAS WORKS, ETC.

SILICA BRICKS, SHAPES and CEMENTS
SPECIAL NON-SPALLING HIGH-ALUMINA MATERIALS FOR DOOR JAMBS and BOTTOM SECTIONS OF VERTICAL RETORTS

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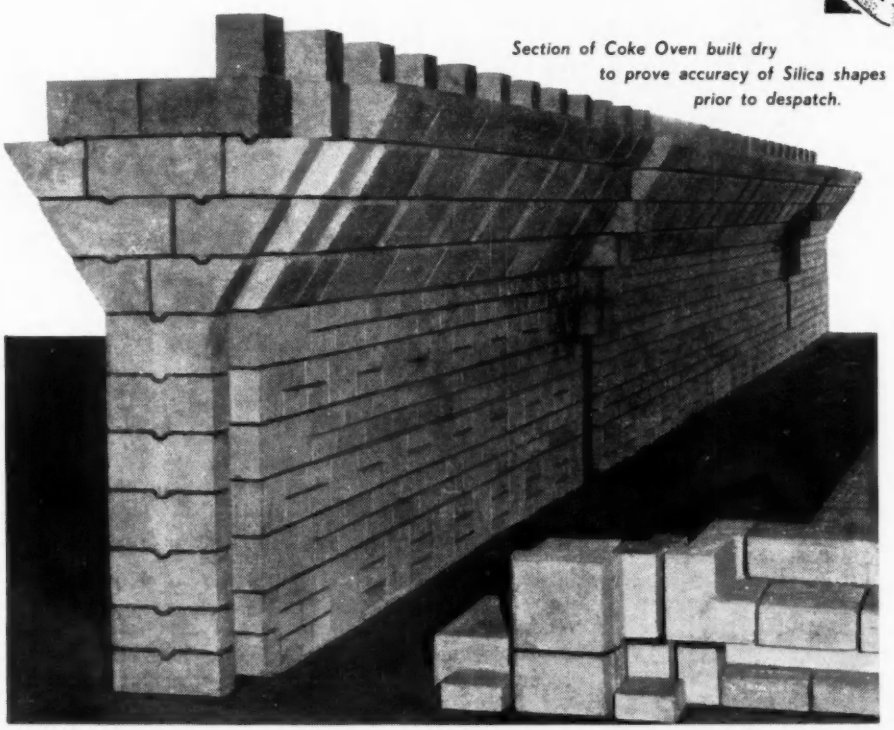

Section of Coke Oven built dry to prove accuracy of Silica shapes prior to despatch.

IT PAYS TO USE CONSETT REFRACTORIES

CONSETT IRON COMPANY LIMITED
CONSETT · CO. DURHAM · ENGLAND
TELEPHONE: CONSETT 341 (10 LINES) TELEGRAMS: STEEL, PHONE, CONSETT

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step

by

step

ELCONTROL

FSM

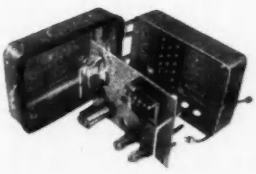
AUTOMATIC BURNER IGNITION

Practically all lighting-up procedures on gas or oil-fired burners and combined gas/oil burners can now be carried out automatically and safely by one of the Elcontrol FSM units.

Based on the monitoring of the pilot and / or main flame by an Infra-red sensitive cell, the FSM automatic Controllers give push-button starting, timed pre-ignition purging, timed ignition, lock out on failure to light-up and running flame failure protection.

Units are available for a very wide variety of burner set-ups and our Advisory Service is at your disposal.

FLAME FAILURE UNITS

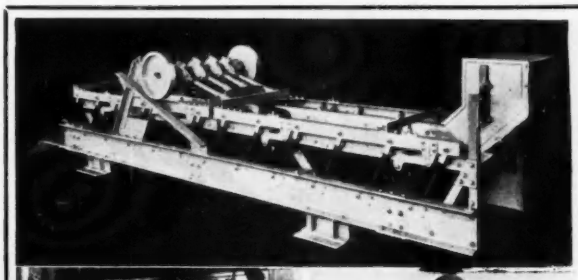


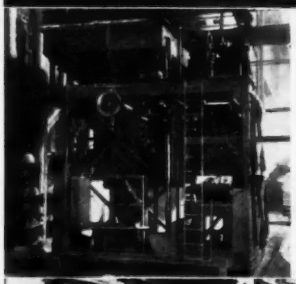
Range also includes simple flame relay units. Most are of the withdrawable chassis type.

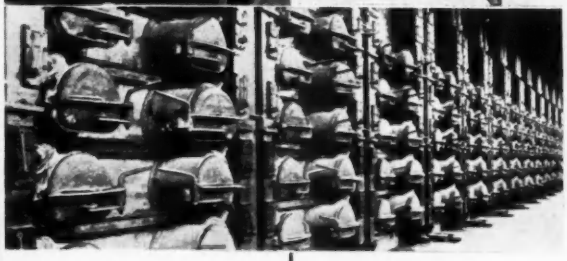
Prices from about **£30**

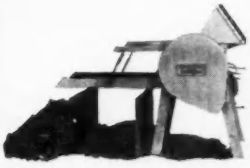
Oil Burner Manufacturers are specially catered for with units to suit their particular needs.

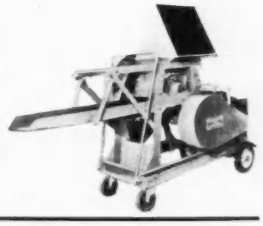
ELCONTROL LTD. 10 Wyndham Place, London, W.1
Ambassador 2671 *for* **LEVEL CONTROLS, TIMERS FLAME FAILURE EQUIPMENT, PHOTOSWITCHES**











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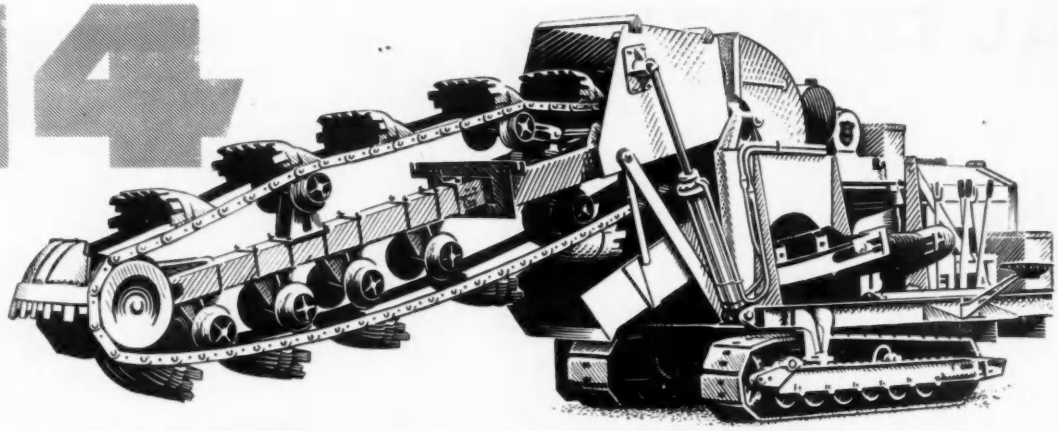

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The ALLEN 14-30 completes a range of all-British trenchers world-renowned for continuous hard work, long life, and freedom from breakdown. It can dig trenches from 14 in. to 30 in. wide, to a depth of 8 ft. 6 in., and has many fine features.

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There is an ALLEN trencher for *your* job.

Illustrated catalogues gladly sent on request.

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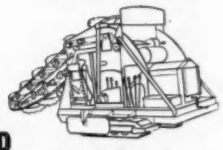

16-60 Trencher

12-21 Trencher

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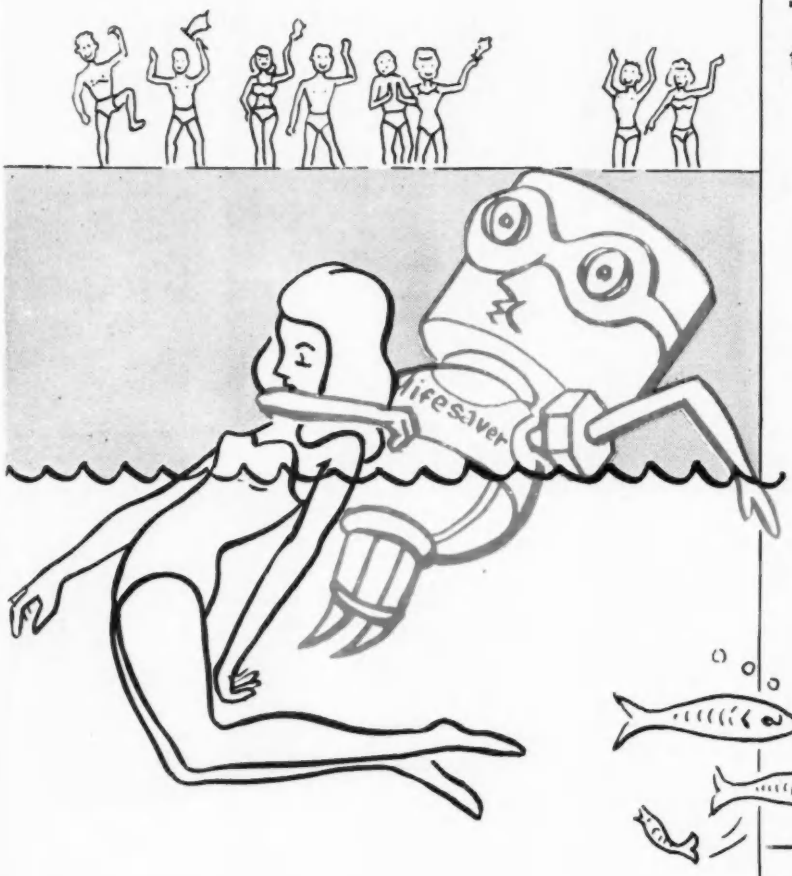
Fire Bricks, Lumps & Tiles

OF EVERY DESCRIPTION

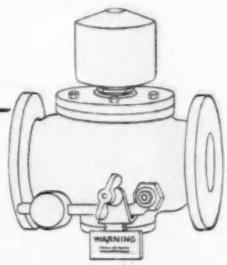
On the subject of CONTROL



—it's know how that counts!

It's a relief to know that you can place complete reliance on your auxiliary services having everything under control. Magnetic Valves have the 'know-how' accumulated over 25 years in the valve manufacturing business, and they can apply it to your control requirements, whether automatic or remote, for air, oil, steam, coal gas, and other industrial liquids and gases. No help from glands, stuffing-boxes, or driving-shafts is required. Ask for our illustrated literature, which gives details of the full range of Magnetic Valves up to 12 in. orifice.

SPECIAL VALVES DESIGNED *if required*
STANDARD VALVES DELIVERED *ex stock*



THE MAGNETIC SAFETY CUT-OUT GAS VALVE

The Magnetic Safety Cut-out Gas Valve is of the semi-automatic hand opening electrically maintained pattern, ensuring instantaneous and complete closure in the event of current interruption. The valve is of 'packless' construction, and can be supplied in sizes ranging from ¾ in. up to and including 12 in.
Alternative types of hand operating gear are available including hand lever, weight return, and push-up spring return patterns.
The installation of this valve is an essential precaution with all types of gas fired equipment and ensures complete isolation of the gas supply in the event of an interruption of the electrical supply WITHOUT automatic opening when such electrical supply is restored.

The magnetic valve co.
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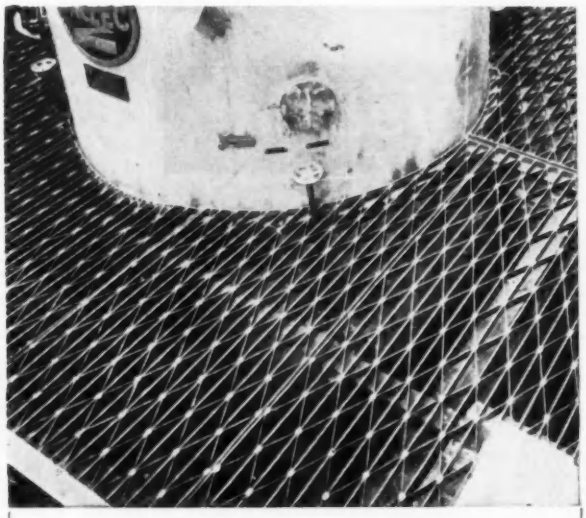

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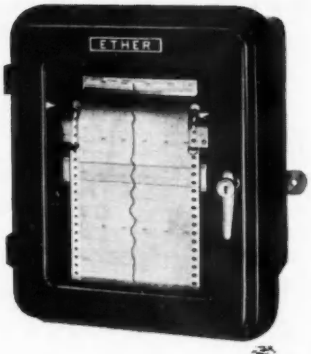
ETHER PYROMETERS

are available to cover every requirement of the most exacting Heat Treatment Problem. They have an international reputation for accuracy, reliability and high-class workmanship and can indicate, record and control temperatures from – 200°C. to + 2,000°C. Send for Lists 645 and 150.



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Recording and Controlling Pyrometer

Will indicate, record and automatically control the temperature of gas-fired furnaces and apparatus within very fine limits, with a substantial saving of fuel.

EDGWISE PYROMETER INDICATOR

Will indicate temperatures rapidly and accurately, and is used in conjunction with resistance bulbs, thermo-couples and radiation tubes at the heat sensitive elements.

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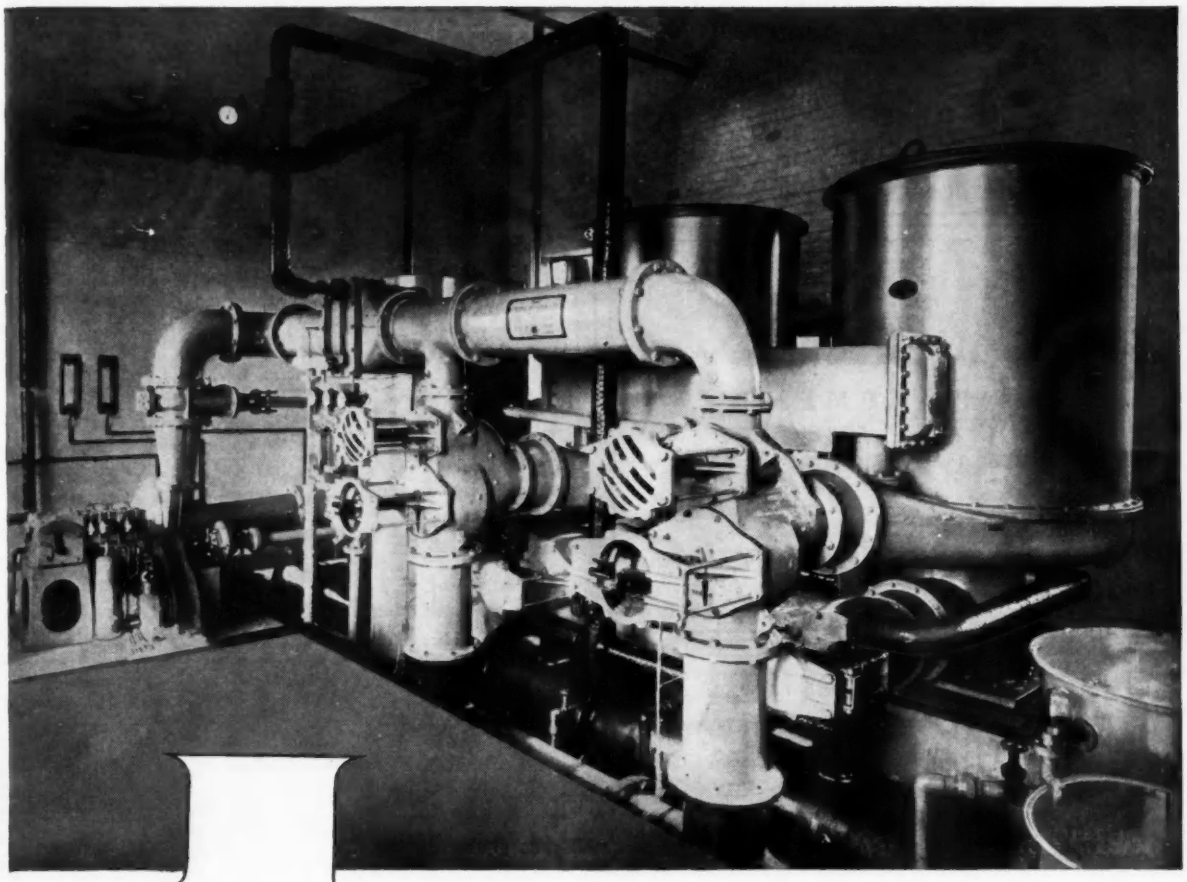

100% recovery of Benzole

HAS BEEN RECORDED

100% recovery of Benzole has been recorded in the Gas Industry where Sutcliffe Speakman plants of the type illustrated are already installed.

These recovery plants are the result of over twenty years' experience in the manufacture and industrial use of Active Carbon. Their capacities range from 250,000 cu. ft. per day. Entirely automatic and with few moving parts, they are compact, clean in operation, and economical to run. Their initial cost, too, compares favourably with that of other recovery systems. In every way they are the most profitable investments. We are always ready to draw up a complete balance sheet for Benzole recovery in any specific undertaking of the Gas Industry.

to cut Benzole wastage to a minimum, consult

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10" & 12" New Cast Iron Flanged Pipes 9' & 12'
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GAS, WATER, & STEAM
Sizes ¼" to 36" in C.I. Gun Metal & Steel.
STEEL TUBES
All sizes up to 24" Flanged, Plain ends, Screwed & Socketed, Loose Flanged, Victaulic & Unicone Joints.
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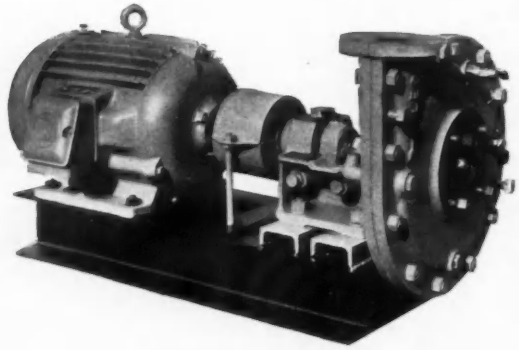

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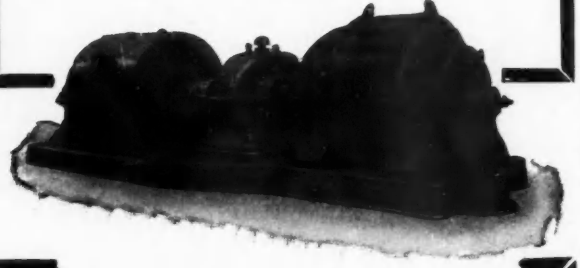
TURBO-COMPRESSORS & EXHAUSTERS FOR AIR AND GAS
★ ★ ★
We build a complete range of Compressors & Exhausters for air and GAS, suitable for all purposes connected with the GAS industry, including Turbo-Compressors for large capacities, as illustrated below



WRITE FOR PAMPHLET No. 1018 GIVING PARTICULARS—
REAVELL & CO., LTD.,
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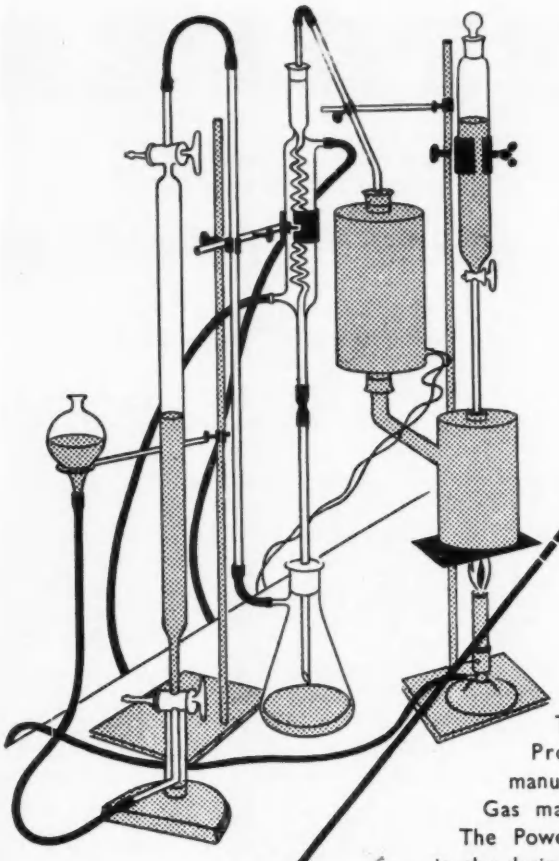
Telegrams: REAVELL, IPSWICH Telephone: 2124 & 5.



RESEARCH

SEGAS

A BRITISH PROCESS

In the years 1945 to 1947, the shortage of gas coal coupled with an increasing availability of Petroleum products from the new U.K. Oil Refinery Programme, led to research in the use of the latter for Town Gas use, in the Laboratories of the South Eastern Gas Board.

This work led to the development of the Segas Catalytic Process and a basis was established for the successful manufacture of Oil Gas, suitable for distribution through Town Gas mains by itself or mixed with other manufactured gas. The Power-Gas Corporation Limited were invited to collaborate in the design and manufacture of a prototype commercial plant of this entirely British Catalytic Oil Gas Process.

DEVELOPMENT

At first, THREE-VESSEL installations were erected and are giving good results but that design has now been superseded by a TWO-VESSEL Regenerative Plant incorporating a separate chamber for the vaporising of oil in steam.

The Segas process is being used for the production of gas from a wide range of refinery products, at a price which currently compares favourably with every other known method of gas manufacture.

SEGAS

Catalytic Oil-Gas Process

THE POWER-GAS CORPORATION LTD

DESIGNERS AND MANUFACTURERS OF GAS PLANT FOR OVER 80 YEARS

STOCKTON-ON-TEES AND LONDON

AUSTRALIA · CANADA · INDIA · FRANCE · SOUTH AFRICA

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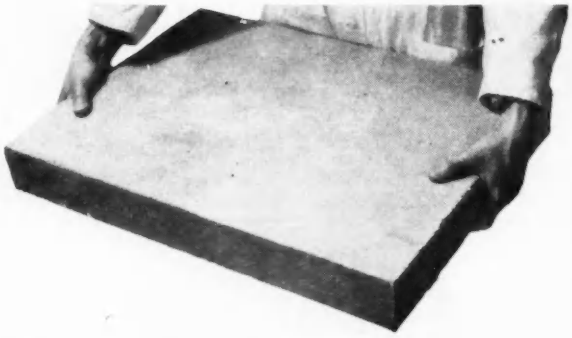

Introducing

THERBLOC

to the Gas Industry

STILLITE mineral fibre insulating slab of "thermal" quality has long been used with complete success by principal gas undertakings throughout the country as an efficient backing to refractory linings. Now, after extensive trials in industry, we recommend an improved form of this insulant–known as THERBLOC

THERBLOC mineral fibre insulating slab offers these advantages :

- **Improved Efficiency.** Reduced conductivity at high temperatures lowers heat losses still further and aids fuel economy.
- **Higher Temperature Range.** Therbloc may be used at an interface temperature of up to 815° C.
- **Greater Rigidity.** The increased density of THERBLOC provides extra strength with obvious structural advantages.
- **Lower Application Costs.** Therbloc is available in large panels which can be worked with ease thus obviating the use of special shaped bricks.

Technical Data Sheet No. 5 gives full details of THERBLOC characteristics and shows temperature gradients and heat losses through typical furnace and oven walls. Send for your copy today.

THERBLOC is one of the

STILLITE

range of mineral fibre insulants

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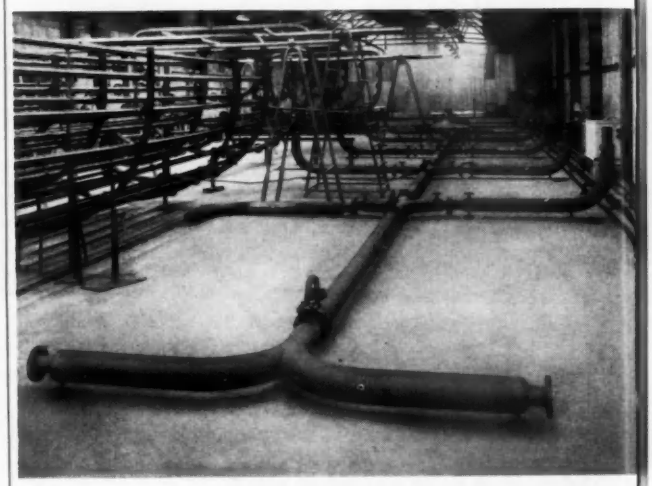
Fabricated PIPEWORK for medium & Low pressure work



All forms of tube in steel, copper, copper nickel, iron, stainless steel, and aluminium alloys. STEELS are already working for the biggest names in industry and under Lloyds supervision. A recent contract for Kuwait included pipe coils in Bitumen Storage Tanks, a jacketed Bitumen pipe line, steam supplies to coils and jacketed lines, condensate recovery, boiler house auxiliaries and boiler house pipework.

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CROWN WORKS, SUNDERLAND

Supplied and installed in Scotland by :

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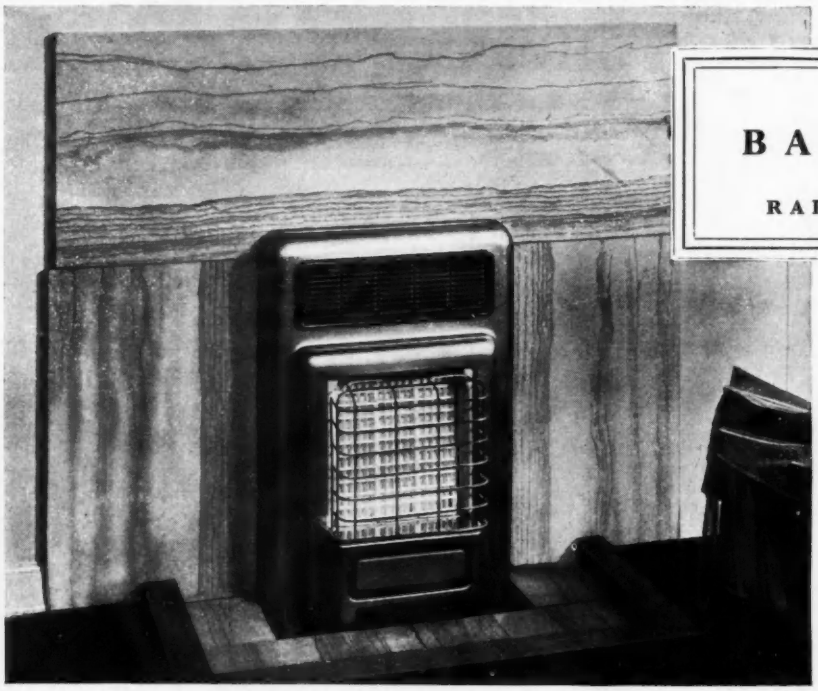

with the

BAMBURGH

Convector

RADIANT GAS FIRE

Associate Bamburgh with the name Bratt Colbran and you have the reason why this elegant well-proportioned fire is a leader in its class. All the features you expect in a Bratt Colbran model are incorporated. Utilising the fullest advantages of convection the BAMBURGH gives 25% more heat without increasing gas consumption, which is a selling point that will clinch many a sale after the attractive design has won the approval of your customers.

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Make a Fine Art of the Fireside

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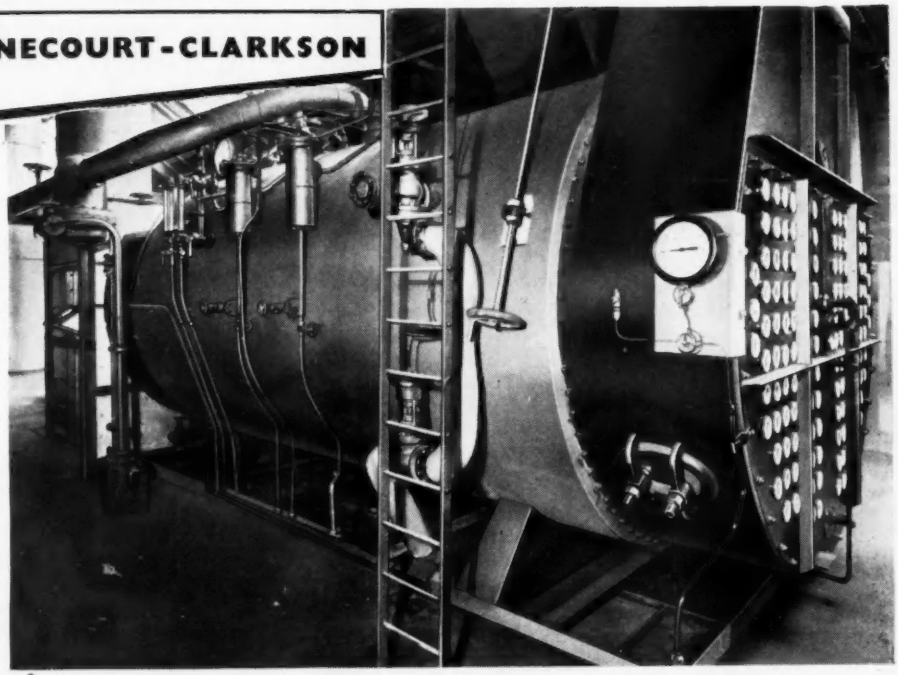

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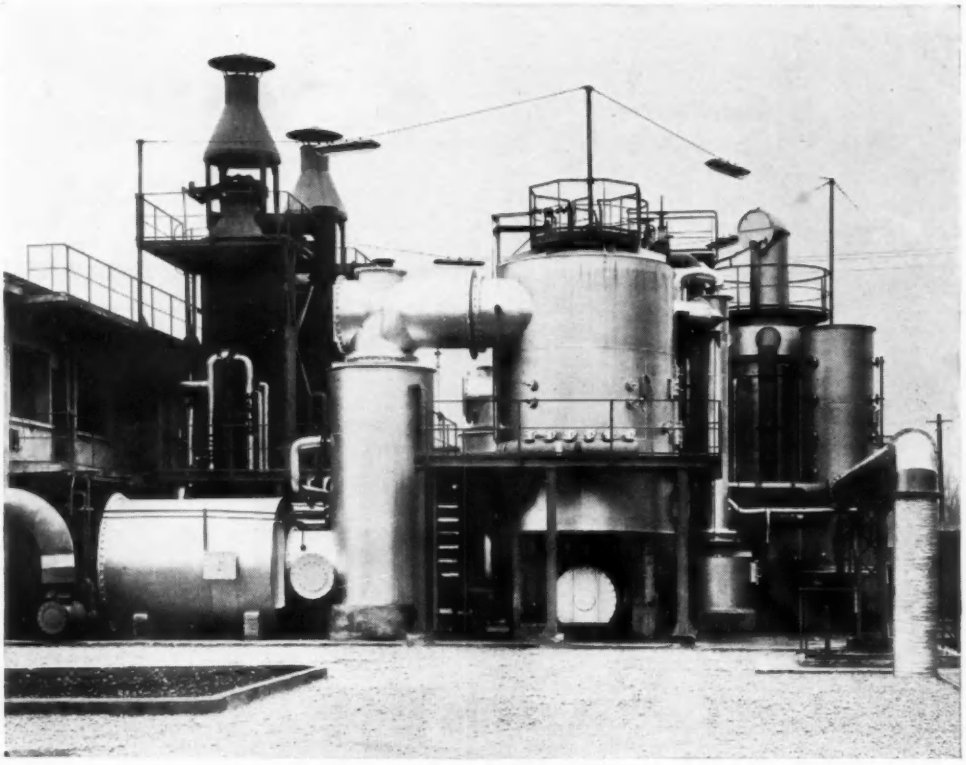

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Gas Journal

VOLUME 285. No. 4835. FEBRUARY 1, 1956. 108th YEAR

CONTENTS

EDITORIAL COMMENT

Gas and the Commercial Load 247
Hands Off Coal! 248

CORRESPONDENCE

Votes of Thanks. George Dougill 249

NEWS OF CURRENT EVENTS

Personal 249
Obituary 249
Diary 249
I.G.E. Examination Pass List 250
Bury St. Edmunds to Double Gas Output 250
Cantilevered Games Stand had 25,000 ft. of Welds .. 250

TECHNICAL RECORD

Distribution of Gas in Birmingham. By R. W. Nelson 251
Recent Developments in Gas Purification. Continued Discussion 258

Gas and the Commercial Load

IT is interesting to consider the extent to which the changing habits of the British people depend on large-scale catering. We know that less cooking is being done in our homes and that more people are enjoying the benefits of canteen meals. The ramifications of this trend have caused a flutter in the psychiatric dovecotes but, interesting though this may be to the anthropologists and the social workers, our concern is more mundane and personal. It is with the effect on gas consumption that we are concerned. We know that the growing preference for 'eating out' is having a deleterious effect on domestic gas consumption, but this would not matter so much if what we lost on this load was recovered by means of our commercial load. Unfortunately that is unlikely since mass production of food is inevitably lighter on fuel consumption per person than domestic cooking. However, what we can and and must do is to ensure that the largest possible proportion of large-scale cooking is performed by gas.

Obviously the catering load is likely to become increasingly important to the gas industry. Our record is a good one and there can be little doubt that over the years gas has won a soft spot in the hearts of countless chefs and catering officers. It has every quality the chef desires—speed, flexibility, reliability, and in the main reasonable price. Its lead over electricity has always been at least the equal of that obtaining in the domestic sphere, but in the domestic situation there has been a perceptible change in recent years resulting from technical advances in the design of electrical apparatus—advances which for the most part have shown no compensating advance by gas. Electricity can now offer the caterer a better service than in the past and is attacking strongly on price. It will need a great more progress if it is to wrest the advantage from gas, but it would be shortsighted indeed not to recognize this danger.

The time is ripe for both sides of the fuel fence to put their cards on the table and for the catering world to assess the relative merits of the rivals' hands. For this reason the 1956 Hotelympia, which opened last Wednesday and continues until February, has come at a most propitious moment. It is two years since the last exhibition was held and it is clear that significant changes have taken place, not only in the technical development of equipment but also in its basic function, a result of changing public taste.

The most striking of these changes is the increase in and development of 'call order' or counter cooking equipment. The reason behind this demand for cooking in public is a little obscure, unless of course it is based on suspicion of 'invisible' cooking facilities, a sentiment which may have been fanned into a blaze of determination by food hygiene propaganda and perhaps by the apparently unfailing desire to emulate American practice. And we must not forget the present-day tendency to cut down the overheads involved in waitress service by the provision of a direct 'cook to customer' service. Be all that as it may, growth in the popularity of establishments offering 'visual cooking' is astonishing. Happily gas operation for this type of installation is well represented at the exhibition, notably on the Gas Council's stand where there is a complete suite incorporating seven items of equipment used in this

form of counter service. It is interesting to compare this with a similar suite on the British Electrical Development Association stand.

The other remarkable change is the comparatively sudden popularity of coffee drinking, notably in coffee bars. The best of these bars provide an amusing and often attractive feature of the West End of London, and the craze is spreading to the provinces. Many such establishments offer Espresso coffee, usually made on machines of Continental origin; and the mushroom popularity of these machines (which are not exclusively gas heated) has provided British manufacturers with a stern challenge. A visit to Hotelympia will show that this challenge is being met and that our own makers can now offer machines which provide the customer with the advantages of individual coffee making, the principal virtue claimed by the Espresso method.

It is cheering to know that in these two aspects of commercial catering gas is well to the fore, and it is clear that other types of gas-operated, large-scale cooking equipment also show definite progress in design and, for the most part, superb quality. There are exceptions to this rule, appliances produced in a mould which should have been scrapped long ago, full of excrescent handles, taps, and filigree nonsense. Fortunately these are very much in the minority and their makers should take the hints dropped by discerning gas catering officers and clean up their products for the good of the industry and for their own good as well. In general, as we have said, design and quality of gas equipment are admirable, and no doubt this fact will be noted by the electrical industry which has set its heart on a fat slice of the 100 mill. therms a year gas catering load.

We cannot help wondering whether the gas industry is inclined to take this handsome commercial load for granted. It is a valuable possession and its importance to the industry will increase as the years go by. Our retention of this load will be dependent on continued appliance development, first-class maintenance and service facilities, and on what can best be described as *esprit de corps*. Might not this constitute a good reason for providing gas industry personnel concerned in this work with a periodical get-together, preferably linked with this exhibition? There will be another Hotelympia in two years time; now, we suggest, is the time to plan a gas catering conference. We leave the thought with those concerned.

So much for the gas aspect of Hotelympia. In closing we may perhaps comment on the exhibition from a more general viewpoint. This is always a bright and enthusiastic show. There is plenty of business about and the catering industry is a friendly one; indeed, an hour or two at the exhibition is apt to leave the casual visitor with the impression that he has been present at a meeting of a genial association. It is a fact that there is the greatest brotherly feeling between the brilliant chefs whose handiwork graces the Salon Culinaire International de Londres, the foremost exhibition of professional cookery in Europe and presented this year on a scale twice as large as ever before. Then there is the Junior Salon Culinaire, shown under the auspices of the Hotel and Catering Institute, a miniature working kitchen (mostly gas) in a demonstration theatre, and many other attractions. This 1956 exhibition is exactly double the size of previous exhibitions and occupies both the National and the Empire Halls. It is fascinating to the layman; to the gasman (if we may use the word in its broadest sense) it has a special interest. This is where part of his salary and pension is coming from.

HANDS OFF COAL!

EVERY schoolboy knows that the principal source of town gas is coal and that if sufficient supplies of coal were to be throttled then people would lose some of the necessities and luxuries of civilization that cannot be replaced by use of electricity. There are, we believe, plenty of sources of electricity, albeit some still potential, without the need to further exploit the world's valuable stores of coal for the production of electricity. Consumers of gas will not be the only losers, however, for the chemical and steel industries also rely considerably upon ample coal supplies. It is therefore with anxiety that we read of some American aluminium-producing concerns that are planning large smelting installations based on coal-generated electricity. The fact that aluminium-smelting is at present one of the prime consumers of hydro-electric power perhaps indicates that the Americans are running short of hydro-electric sites, but it is also a warning that the world's coal reserves are to be more viciously exploited than ever before.

In this country, Mr. K. T. Spencer, Chief Scientist of the Ministry of Fuel and Power, recently told the Coal Industry Society that one way in which we could win our coal resources more economically and in greater quantity than at present would be by not mining it at all, but by underground gasification which had been under experimental investigation for the last six years in a partnership between the Ministry of Fuel and Power and the National Coal Board. He said that since 1949 some 50 separate trials of underground gasification had been made, and 5,000 tons of coal that could not have been economically exploited by deep-mining or open-cast working, had been gasified. At first this might appear to offer an encouraging prospect to the nation. But how is such gas to be used? Mr. Spencer went on to say that some economic estimates had been made and the indications were that underground gasification could produce gas on the site at about 2½d. per therm; and when it was remembered that power station coal cost nearly 1d. more than that per therm at the power stations in many districts, it was not a bad result from the experimental work. The conclusions were that the gas could be converted into electricity certainly no more expensively, and possibly rather more cheaply, than the conversion of the coal itself into electricity. Even this might seem to be a good prospect, but we would suggest that the electrical industry, with hydro, solar, tidal, wind, and nuclear energy at its ready disposal, should leave coal and natural gas where they are, instead of accelerating the depletion of reserves. Thus the gas and chemical industries, which have few alternative sources of raw materials, might thrive the longer.

MEMBERS of the London Typographical Society and the Typographical Association are 'working to rule' in the course of a dispute with the British Federation of Master Printers. This has affected last and this week's issues of the 'JOURNAL,' and there is no means of anticipating how long the dispute will continue. Only the minimum of new matter can be presented and some promised articles and features have had to be cancelled or held over. In addition to the decreased standards there are also likely to be delivery delays. We ask our readers to forgive our limitations thus imposed which, it can clearly be seen, are due to circumstances beyond our control.

Personal Notes

MR. R. S. OWEN has been appointed Sales and Service Superintendent, Northern Division, Scottish Gas Board, with effect from February 1. Educated at Woodhouse Grammar School, he joined the Northern Middlesex Gas Company in 1930. He served under Mr. H. R. Hart until nationalisation when he was transferred to the Headquarters Division, North Thames Gas Board. Mr. Owen served in the Royal Auxiliary Air Force from 1932 until 1946.

MR. P. K. MARLOW, formerly Assistant to the Chief Accountant, has been appointed Assistant Accountant to the North Thames Gas Board. MR. A. E. TYRRELL, formerly Chief Industrial Representative, is to be Deputy Divisional Manager, Headquarters Division. Changes of title also announced by the Board are MR. T. C. HAYNES to be Architect (Showroom Design and Display) and MR. C. A. BLOOMFIELD to be Office Manager, Coke Department. MR. P. J. GLANVILLE, Statistical Officer, is to retire at the end of February. In his place, on the staff of the Commercial Manager, the Board have appointed MR. C. W. HITCHCOCK.

MR. H. W. MOYS, B.SC. (ENG.), A.K.C., A.M.I.C.E., M.INST. OF F., has been appointed Staff Controller of the North Thames Gas Board in succession to Mr. R. N. Bruce and with effect from May 1, 1956. Mr. Moys, who is 48, was educated at Mercer's School and King's College, London, where he took an Engineering degree. He joined the Gas Light and Coke Company in 1927 as a pupil, serving first at Fulham Works, then in the Drawing Office and in the Distribution Department. On completion of his pupilage in 1930 he was appointed as an Assistant Engineer at Beckton and during the following five years served in a similar capacity at Shoreditch, Brentford, Staines and Bromley Works. At Bromley, Mr. Moys was

successively Assistant Engineer, Deputy Engineer and Station Engineer. In 1952 he was appointed Group Engineer. Since the war, Mr. Moys has been a member and chairman of the Board of Examiners for the Institution of Gas Engineers. A keen footballer, cricket and tennis player, Mr. Moys has played for the Sports Association's tennis teams in representative matches.

Obituary

ALDERMAN E. J. CLARKE, head of the firm of W. H. Clarke and Co. solicitors of Leeds, has died after a long illness. He was one of the longest serving members of the Leeds City Council and before nationalisation he served on the Gas Committee and had wide experience of this work, holding national appointments in connection with the gas industry, including four years as vice-president of the British Commercial Gas Association.

MR. G. H. JUDD, formerly Engineer and Manager of Sheringham Gas and Water Company, died suddenly on January 26 in his 81st year. Following his father's footsteps he joined the staff of the Gas Light and Coke Company in 1888 and started as a telephonist in Beckton Gas Works. After a number of years' experience in gas manufacture he obtained the position of Works Engineer and Assistant Manager of The Crays Gas Works in Kent. In 1904 he moved to Norfolk and became Engineer and Manager of Sheringham Gas and Water Company until his retirement in 1945. He was a keen sportsman and played cricket, golf, bowls, and has played hockey for Norfolk County.

MR. WILLIAM TENNANT, Director of Wailes Dove Bitumastic Ltd., Hebburn, and Manager of the London Office of that Company, has died after a long illness. Mr. Tennant, who was 66, joined the Company as a boy more than 46 years ago and was appointed to a seat on the Board 12 years ago.

Diary

February 2.—MIDLAND I.G.E.: Discussion on Coke Symposium introduced by J. Burns, W. R. Branson and F. J. Eaton. Queen's Hotel, Birmingham. 2.30 p.m.

February 3.—INSTITUTE OF FUEL, SOUTH WALES SECTION: 'Research at the National Coal Board,' Dr. W. Idris Jones. South Wales Institute of Engineers, Park Place, Cardiff. 6 p.m.

February 3.—LONDON AND SOUTHERN JUNIORS: 'A Review of Post-War Domestic Gas Water Heating,' G. E. Johnson and C. H. Taylor. Meyerstein Theatre, Westminster Hospital School of Medicine, Horseferry Road, S.W.1.

February 7.—SOUTH EASTERN G.C.C.: Caxton Hall, Westminster, London, S.W.1. 10.45 a.m.

February 7.—MIDLAND JUNIORS: 'Some Aspects of Dry Purification', S. C. Porter. Staff Mess Room, West Midlands Gas Board, Council House, Birmingham.

February 8.—INSTITUTE OF FUEL, NORTH WESTERN SECTION: 'Some Recent Advances in Fuel Research,' Dr. W. Idris Jones. Joint meeting with National Smoke Abatement Society (North Western Division). Engineers' Club, Albert Square, Manchester. 2.30 p.m. (Members' luncheon 1 p.m.).

February 8. — MANCHESTER JUNIORS: Meeting at Liverpool.

February 10.—SCOTTISH JUNIORS (WESTERN): 'Modern Control Equipment,' Gas Showrooms, 522, Sauchiehall Street, Glasgow, C.2. 6 p.m.

February 10.—INSTITUTE OF FUEL, EAST MIDLANDS SECTION: Annual Dinner. 'Black Boy,' Nottingham, 6.30 p.m. for 7 p.m.

February 11. — SCOTTISH JUNIORS (EASTERN): Address by H. H. Grattidge, Area Engineer, N.I.F.E.S. Gas Showroom, Falkirk.

February 13.—ILLUMINATING ENGINEERS: 'Photometric and other Tests for Street Lighting', W. A. Varney. Medical Library, The University, Western Bank, Sheffield, 10. 6.30 p.m.

February 14.—ILLUMINATING ENGINEERS: 'Lighting at London Airport', J. G. Holmes. Lighting Service Bureau, 2, Savoy Hill, W.C.2. 6 p.m.

February 15.—MANCHESTER JUNIORS: Visit to works of Bryan Donkin Co., Ltd., Paper by R. J. Bramhall.

February 15.—INSTITUTE OF FUEL: 'Oil from Coal Project of the South African Government,' P. E. Rousseau. Institution of Civil Engineers, Great George Street, S.W.1, London. 5 p.m.

Correspondence

VOTES OF THANKS

DEAR SIR,

May I put a point arising from your leader in the JOURNAL for January 11? You very rightly criticize the proposing and seconding of votes of thanks and suggest the substitution of thanks by the Chairman.

I support your criticism but would like you to consider a method which is already in action with the London and Southern Section. As a Vice-Chairman I objected to 'seconders'. If the proposer is good, he gets the meeting in the right mood and 'conveys' the thanks of the meeting. A seconder falls flat, so now at our meetings one man (not strictly a 'proposer of a vote of thanks') thanks the speaker, says why, and asks the meeting to support him in the usual way. It works well, is brisk and, as we try to choose someone with particular interest in the paper, sounds and is genuine. I shall continue on the same lines next year when I take over the Chair.

Yours, etc.,

GEORGE DOUGILL,

Manor Road,
Chigwell,
Essex.

January, 1956.

I.G.E. EXAMINATION PASS LIST

Including 'Salesmanship' Certificate

The Institution of Gas Engineers has issued a Pass List in respect of the 1955 examinations, incorporating a list of the candidates who have been awarded the Certificate in Gas Salesmanship and Consumer Service. The following candidates passed the main subject examination under the old regulations and have now qualified for the award of certificates by completing outstanding ancillary subjects.

Higher Grade Examinations.—Internal Candidates. Gas Engineering (Manufacture).—2nd Class: Franklin, R. G. (Cardiff College); Ingham, R. (Burnley College). Gas Engineering (Supply).—2nd Class: Hazeldean, C. D. (Brighton College); Lofthouse, D. B. (Westminster College). External Candidates. Gas Engineering (Manufacture).—2nd Class: Bull, R. (Tipton); Hendry, G. D. (Cambridge); Luxton, C. W. B. (Paignton); McHugh, J. (Rushden); Phillips, D. S. (Feltham). Gas Engineering (Supply).—2nd Class: Lowe, J. H. (Burntisland); Rumney, M. W. P. (Southampton); Thomas, D. A. (Manchester).

Ordinary Grade Examinations.—Internal Candidate. Gas Engineering (Manufacture).—2nd Class: Ingham, R. (Burnley College). External Candidate. Gas Engineering (Manufacture).—2nd Class: Hendry, G. D. (Cambridge).

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(First Class)

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Freestone, W. C. (Eastbourne)	South Eastern
French, A. K. (Hemel Hempstead)	Eastern
Higgins, F. R. (London)	North Thames
Hyne, A. J. (Sidcup)	South Eastern
Lockwood, K. (Leeds)	North Eastern
O'Brien, J. R. (London)	Eastern
Purl, H. S. (London)	North Thames
Stanyon, H. V. (Arundel)	South Eastern
Twelftree, D. G. (London)	North Thames
Tuck, E. H. (Southwick)	South Eastern
Whiley, D. J. (London)	North Thames

(Second Class)

Allen, L. E. (London)	South Eastern
Braithwaite, A. (Leeds)	North Eastern
Breeds, A. E. (St. Leonards)	South Eastern
Breeze, J. A. E. (Orpington)	South Eastern
Butterfield, G. (Leeds)	North Eastern
Chapman, A. P. (Eastern)	Eastern
Clayton, R. A. (London)	North Thames
Collis, L. G. (Sutton)	South Eastern
Curtis, D. J. (Coulsdon)	South Eastern
Donne, G. W. (Brighton)	South Eastern
Dunn, F. (Edinburgh)	Scottish
Estcourt, A. J. (London)	North Thames
Eaddie, S. (Leeds)	North Eastern
Fielder, G. E. (Margate)	South Eastern
Finch, R. G. (Hemel Hempstead)	Eastern
Fordyce, A. A. (Cambridge)	Eastern
Frost, M. J. (Bromley)	South Eastern
Frost, V. A. H. (St. Leonards)	South Eastern
Gale, E. C. (East Barnet)	Eastern
Garrett, A. R. (London)	North Thames
Harman, W. T. (Bognor Regis)	Southern
Heighton, J. G. N. (Worthing)	South Eastern
Hill, H. S. (London)	North Thames
Holt, F. C. (Romford)	North Thames
Jackson, J. C. (London)	North Thames
James, W. G. (Cardiff)	Wales
Johnson, W. R. (Harrow)	North Thames
Jones, S. (London)	North Thames
Kenyon, B. W. J. (Clacton)	Eastern
Lumley, E. (Ashtead)	North Thames
Marsh, A. F. (Eastbourne)	South Eastern
Mason, S. S. (London)	North Thames
Mizen, T. J. (Cambridge)	Eastern
Page, K. E. L. (Romford)	North Thames
Parish, C. (Hull)	North Eastern
Rickett, G. W. (London)	Eastern
Sheppard, E. (Epsom)	South Eastern
Simmons, J. W. (London)	North Thames
Singer, H. C. (London)	North Thames
Strachan, J. D. (London)	North Thames
Voak, S. J. (Brighton)	South Eastern
Watson, P. D. (Hastings)	South Eastern
White, K. R. (London)	Eastern
Witty, D. (Leeds)	North Eastern

Associate Membership Examination.—Gas Engineering (Manufacture). W. G. Amias (Dawley); J. M. Attwood (Pershore); Hilton, W. G. (Liverpool); Sutherland, V. (Hawick); and Wilson, N. J. (Halifax).

News in Brief

In view of the continued development of business in their Southend and Romford Districts, North Thames Gas Board have decided that each District shall be constituted as a Division. With immediate effect, therefore, the Southend District becomes the East Essex Division with Mr. A. A. Hall (formerly District Manager) as Divisional Manager, and the Romford District becomes the Mid-Essex Division with Mr. A. R. Shirley, J.P., its former District Manager, as Divisional Manager.

A new battery of 20 coke-ovens has been erected at the Fell Coke Works (Co. Durham) of the Consett Iron Co. Ltd. Built and completed ahead of schedule by Gibson Brothers of Dudley, Worcestershire, the new ovens complete the second stage of a scheme for replacing a battery of ovens built in 1924. The first stage of the work was completed two years ago. The new battery will use about 3,300 tons of coal a week.

At the Annual General Meeting of the Junior Institution of Engineers held recently, the following officers were elected: As Chairman, Mr. J. C. Y. Baker; as Vice-Chairmen, Messrs. J. E. Gray, R. Whitehead; as Hon. Treasurer: Mr. S. H. Hole; as Hon. Editor: Mr. J. Foster Petree; and as Hon. Librarian: Mr. J. A. Roberts. Messrs. E. E. Burrage, W. J. Kease, J. E. Dodsworth and M. W. Parkin were elected Councillors.

BURY ST. EDMUNDS TO DOUBLE GAS OUTPUT

TO meet a heavy and steady increase in the demand for gas in Bury St. Edmunds (Suffolk) extensions costing many thousands of pounds have been going on for some time to double the output of the Bury St. Edmunds gas-works of the Eastern Gas Board.

In the late summer a 750,000 cu.ft. capacity three-lift gas holder will be completed and brought into action.

There is a very high consumption per consumer in Bury St. Edmunds and demand had reached such a pitch that the holder at present in use (283,000 cu.ft. capacity) was totally inadequate both for storage and pressure purposes. The new holder will give approximately 20 hours supply on a maximum winter's day consumption.

At the outbreak of the first world war the old Bury Gas Company was sending out a maximum of just over 250,000 cu.ft. per day, as compared with the present figure of over 900,000. Comparatively the demand has increased more heavily since 1939. Then something over 100 mill. cu.ft. of gas was supplied each year. Now, 17 years later, consumption has gone up to close on 220 mill. per year.

After being held up for a considerable time because of the steel shortage (600 tons have gone into the holder itself), Firth, Blakeley, Sons & Co., Ltd., began work on building the three-lift holder in the summer of 1954. It will be 120 ft. high when completed. Some 250 piles had to be driven, some of them as deep as 60 ft., by the Frankie Piling Company, who executed the foundation work.

Cantilevered Games Stand Had 25,000 ft. of Welds

IN preparation for the 1958 Empire Games to be held at the Rugby International Ground, Cardiff Arms Park, the South Stand is being extended to accommodate an additional 3,350 seats.

A novel form of design by the Consulting Engineers, W. S. Atkins & Partners, Park Place, Cardiff, is being used, whereby all supporting columns at the front of the stand are eliminated, allowing an uninterrupted view of the playing area. To achieve this unusual feature, 4 ft. deep all-welded plate girders cantilever from the back of the stand and together with the raker beams form the terrace for the seating.

The fabrication of the 250 tons of structural steelwork by Rees & Kirby, Morriston, Swansea, involved over 25,000 ft. of ¼ in. fillet welds.

Welding was done by the Quasi-Arc 'Twin-arc' process. Due to the high deposition speed with this process on long runs, an overall saving of 40% in cost over the ordinary single arc welding was estimated in addition to a 25% increase in production. The welding satisfied all the requirements of the inspecting engineers for this important load-bearing structure.

When completed, the stand will be over 300-ft. long and will be covered by a roof of aluminium alloy, cantilevered from the back of the terrace. This cantilever roof will also cover the existing stand, the room of which will be dismantled.

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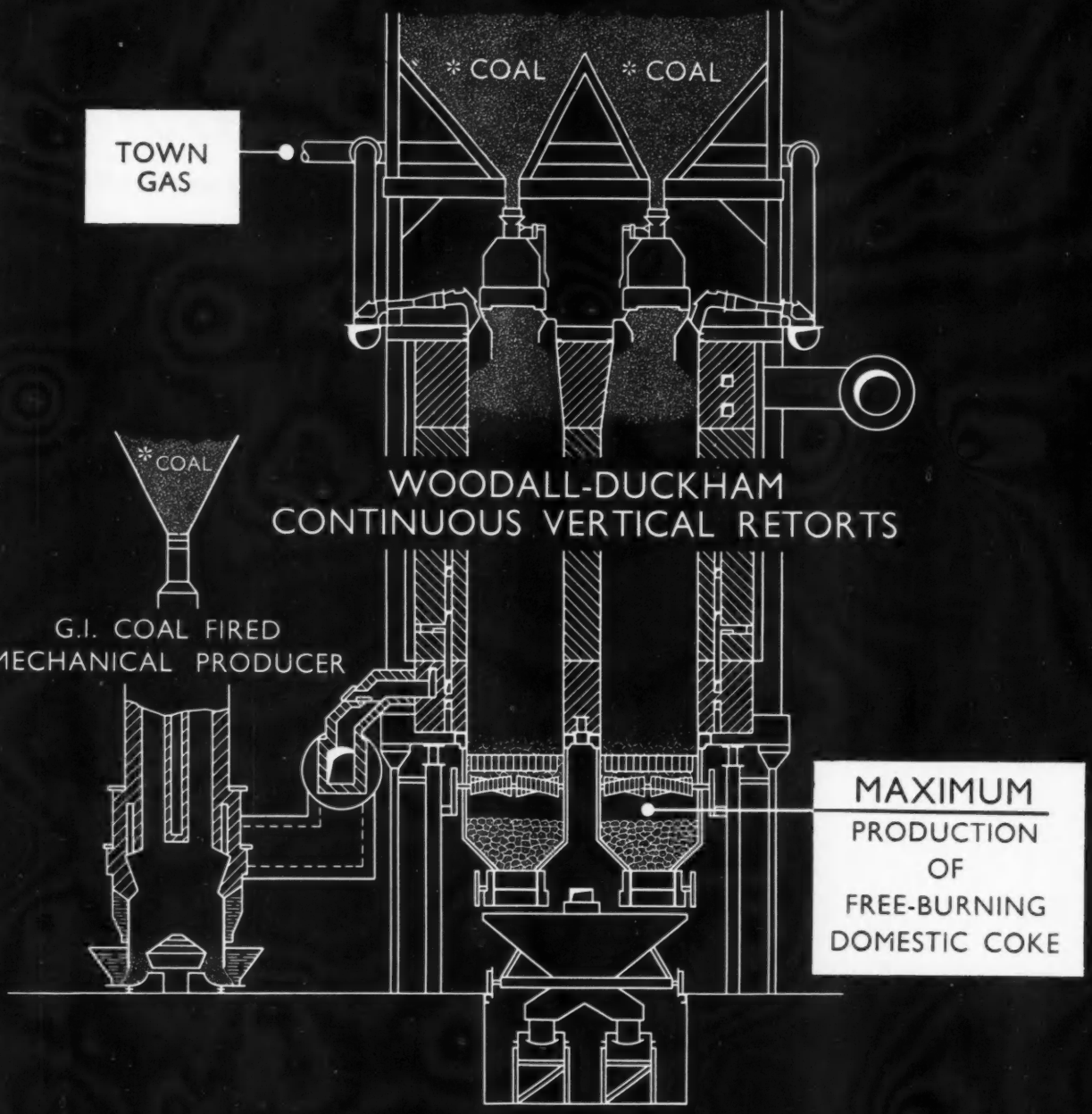

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DISTRIBUTION OF GAS IN BIRMINGHAM*

By R. W. NELSON, B.Sc., A.M.I.Mech.E.†

THE Birmingham District of the Midlands Gas Board is responsible for the supply of gas to an area of approximately 195 square miles, including a highly industrialized section of the country and also a considerable domestic area. Table 1 gives certain relevant figures for 1954-55.

Table 1.—Gas Supply in the Birmingham District, W.M.G.B., 1954-55

Classification of Load	Consumption in therms	Proportion	No. of Consumers	Therms per Consumer
		%		
Industrial	55,471,407	46.9	5,091	
Domestic	49,477,837	41.8	358,243	138.7
Commercial ..	8,753,066	7.4	12,580	
Public administration	2,631,564	2.2	1,790	
Public lighting ..	1,998,006	1.7		
	118,311,880	100.0		

The number of therms per average domestic consumer is among the highest in the Board's area, and the District makes a very substantial contribution towards the Area's industrial load, which is the highest in the country.

The large industrial component of the Division's total load has a pronounced and beneficial effect on the load factor. This is reflected in the figures quoted below, which were the maximum recorded in the period 1954-55:—

	Mill. cu. ft.	
Consumption over 12 months ..	29,748	246 × maximum day
Maximum week	724.6	6.23 × maximum day
Maximum day	120.79	15.7 × maximum hour
Maximum hour	8.225	

Although the maximum hour was recorded on a Monday, the instantaneous peak demand is on a Sunday, when the cooking load is concentrated over a period of some 30 min., with the instantaneous peak occurring at approximately 12.40 p.m. The instantaneous peak demand at that time approaches 10 mill. cu.ft. per hour.

During the past few years the load on a Monday morning has been the most difficult to contend with, in that the flow rate approaches the Sunday peak and is much more sustained. Maximum demand can be anticipated if the weather is frosty yet bright, for under these conditions the industrial start-up (about 7 a.m.) is supplemented at mid-morning by the washing load, and in aggregate a fairly constant heavy demand is experienced from 7 a.m. to 2 p.m. These conditions are all the more difficult to handle if a district is vitally dependent upon district storage to meet the demand.

The general pattern of demand in terms of manufacture is such that minimum stocks are arrived at by approximately 7 p.m. on a Friday evening and this in turn means that the main effort in output is concentrated over some 4½ days (6 a.m. Monday to 7 p.m. Friday), during which period the fullest advantage can and should be taken of available storage.

Over the past 10 years the maximum day/maximum hour relationship has gradually increased from 13.7 to the present figure of 15.7—*i.e.*, an increase of 39% on the maximum hour over this period has been accompanied by an increase of over 60% on the daily output. Over the same period the industrial load has increased by 78%, and one can only conclude that the improved load factor now being enjoyed is very much influenced by this.

It should be noted that it is frequently possible to provide for an industrial load without any increase in the size of the mains system—*i.e.*, in designing a mains system to meet the domestic peak, one can readily accommodate a substantial industrial load, the incidence of which does not normally coincide with the domestic peak.

Principal Manufacturing Stations

The supply to the Birmingham District is derived from four principal manufacturing stations—*viz.*, Windsor Street, Nechells, Swan Village and Saltley. Three of these are situated centrally within the city boundary but the fourth, Swan Village, is in fact in West Bromwich, although the greater proportion of the gas manufactured at this station is used in the Birmingham District. The manufacturing capacity and storage available at these works is as follows:—

	Nominal Manufacturing Capacity, mill. cu. ft. per day		Storage mill. cu. ft.
	Coal gas	Water gas	
Windsor Street ..	26	9	17
Nechells	22.5	26	32
Saltley	18	3	including 20 mill. cu.ft. at Washwood Heath
Swan Village	16.6	6	11
	83.1	44	60

The large diameter trunk mains and the substantially proportioned booster main to the north of the city provide considerable flexibility in the distribution of gas throughout the area of supply, enabling the works to operate at varying outputs, yet retaining as a whole an adequate production and distribution situation.

Mains System

Cast iron mains in use on the district vary from 3 in. to 48 in. diameter and total almost 2,500 miles, 4 in. mains contributing over one-third of the total length.

There are three principal mains systems:—

(i) *Low Pressure System.*—From each of the three Birmingham works (not Swan Village) there emanate large diameter low pressure mains. These carry the supply to the whole of the central area, although their field of influence is obviously dictated by the extent of the hourly load and widens from a figure of 2-3 miles radius at peak periods under winter load conditions to almost the entire area for, say, some eight hours daily. In all cases these low pressure mains are supplied through governors from low pressure boosting machinery on the following lines.

Works	Governors	Served by
Windsor Street	36 in. Aston 30 in. Farm Street 36 in. Pritchett Street 36 in. Bagot Street	One 2½ mill. cu. ft. per hr. × 12 in. W.g.; and Two 1¼ mill. cu. ft. per hr. × 12 in. W.g. electrically-driven boosters.
Nechells	48 in. Mount Street 30 in. Sutton 36 in. Birmingham 30 in. Small Heath	Two 2 mill. cu. ft. per hr. × 15 in. W.g. steam turbine driven boosters.
Saltley	36 in. Small Heath 48 in. Birmingham	

The large diameter low pressure mains in addition to fulfilling an important work in meeting consumer demand are

* From a paper to the Midland Junior Gas Association, January 10, 1956.

† Divisional Distributing Engineer, Birmingham and District Division, West Midlands Gas Board.

DISTRIBUTION OF GAS IN BIRMINGHAM

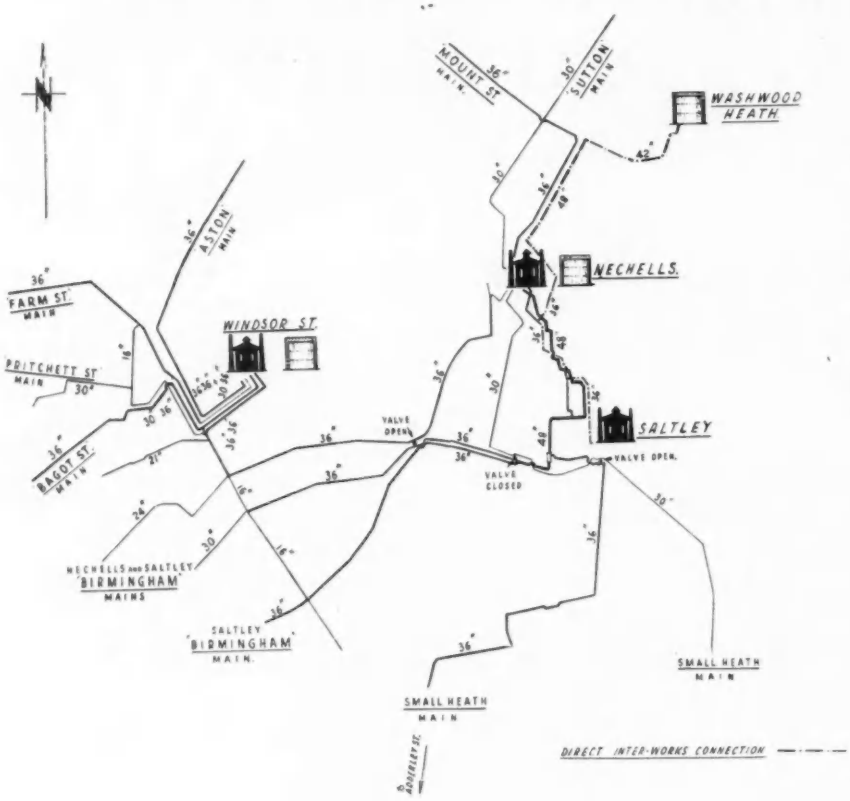


FIG. 1.—PRINCIPAL LOW PRESSURE MAINS IN VICINITY OF WORKS

FIG. 2.—PRINCIPAL MAINS SYSTEM AND BULK SUPPLY POINTS

used as a medium for stock balancing between works. This is particularly valuable in the case of the Windsor Street and Nechells Works. Fig. 1 illustrates the principal low pressure mains and the inter-works connecting mains.

(ii) *Booster Mains System.*—This connects the Washwood Heath holder/booster station with Swan Village works/distributing station, and while it was originally designed to meet consumer demand to the east-northwest arc of the city, it now plays an important part in dealing with gas from the Swan Village works. Fig. 2 shows the layout of this system, which can be readily adapted to permit interchange of gas to the central area. It should be noted that the important bulk supply connection with Coventry merges with this booster mains system at its southern terminus—*i.e.*, the Yew Tree, Yardley.

(iii) *High Pressure System.*—This system (24 in, 18 in., 16 in., 12 in. and 9 in. diameter mains) emanates from the Windsor Street works and terminates at Longbridge. It serves five governor stations en route. The system operates at a maximum pressure of 35 in. mercury and is shown in Fig. 2. On the same diagram a new mains system emanating from Washwood Heath is shown. These new mains, which merge with the present high pressure system and will thus provide interchangeability of supply between Windsor Street and Washwood Heath, are scheduled for completion in the autumn of 1956. They will have the effect of increasing the capacity of the present system from 15 mill. cu.ft. per day to 25 mill. cu.ft. per day.

District Storage

To supplement the works output during the day, use is made of district storage. This is available at (a) Adderley Street, (b) Longbridge, (c) Wythall, and (d) Coleshill.

(*a*) *Adderley Street:* This functions as a holder/re-boosting station. It takes gas from Nechells via both the Nechells and the Saltley/Small Heath governors and by means of electrically driven boosters makes this available for distribution to the south of the station via the Camp Hill and Moseley governors.

(*b*) *Longbridge:* At Longbridge, the terminus of the high pressure system, there is available a releasable volume of gas amounting to approximately 1 mill. cu.ft. This gas is stored in two cylindrical high pressure vessels, 25 ft. in diameter by 200 ft. long, one of riveted design, the other of butt welded construction. These vessels are among the largest in the world.

Longbridge supplements the supply to the high pressure system, and from the point of view of economy of operation is an excellent application of district storage. Under winter conditions this station is used to capacity over the full 24 hour cycle. Release of gas from the station has to be very carefully controlled; otherwise continuity of supply to the consumer would be jeopardized. The Longbridge station has filled a very important rôle in meeting the pronounced increases in the industrial and domestic load at this extremity of our supply system.

(*c*) *Wythall:* This high pressure holder station serves an essentially domestic and, until recently, rural area. The total storage is only 50,000 cu.ft. (releasable gas), the maximum storage pressure being 60 lb. per sq. in.

The storage vessel is of butt welded design. The load factor at this station is not so favourable as at Longbridge, for its main function is to meet the domestic peaks. On this account the periods of release are of considerably less duration than at Longbridge. The station also differs fundamentally from Longbridge in that it takes gas from and releases it to a low pressure consumer network.

(*d*) *Coleshill:* Here we have conventional low pressure storage amounting to 30,000 cu.ft., this being used to supplement the low pressure system, particularly on Sundays.

Bulk Supplies

Nationalisation has accentuated the desirability of interchanging gas between neighbouring divisions and districts. There has been a steady growth in this direction over the past few years, and the following information gives some idea of the arrangements now in force.

This increased facility to exchange gas is of immeasurable value from both the overall production and from the purely distribution points of view. In many of the instances quoted below, the connections were made with adjoining districts to rectify in the most economical manner a pressure deficiency.

FROM Birmingham to—

District	Supply point	Potential capacity cu. ft. per hr.	Type of connection
West Bromwich	Dudley Street	75,000	By governing from booster main.
	Roebuck Lane	100,000	
	Witton Lane	200,000	
West Bromwich	Hamstead area	20,000	Fringe connection—merging of adjoining low-pressure systems.
Oldbury	Oldbury works	350,000	Direct booster main from Swan Village.
Smethwick	Halford Lane	75,000	By governing from booster main.
Walsall	Wood Green	100,000	Direct supply, Wednesbury District to Walsall holders.
Coventry	Packington	100,000	High-pressure main from Yew Tree, Yardley, to Coventry holders.
Bromsgrove	Birmingham Road	35,000	By merging the adjoining low-pressure systems.
Tipton	Leabrook Road	5,000	By merging the adjoining low-pressure systems.
Dudley		50,000	By direct high-pressure main from Swan Village works to Dudley.
Solihull	Solihull works	100,000	Direct connection Birmingham District to Solihull holders.
Solihull	Stratford Road, Shirley	10,000	By merging the adjoining low-pressure systems.

TO Birmingham from—

Smethwick	Rabone Lane	200,000	Direct from works on to Birmingham District.
Smethwick	Woodburn Road		Direct from works holder station on to Birmingham District.
Coventry	Yew Tree, Yardley	250,000	From Coventry/Birmingham high-pressure main into the Birmingham booster main system.
Walsall	Wood Green	150,000	Direct from works to Wednesbury District.
Solihull	Lode Lane	100,000	Direct connection Solihull works to Birmingham low-pressure system.

The situation of these connections is illustrated in Fig. 2.

The main value of the bulk supply arrangements is probably that of flexibility and this feature is exploited to the best overall advantage under conditions of extreme demand or where account has to be taken of works repairs. To illustrate the increasing use of this facility, 700 mill. cu.ft. more gas were transferred from Birmingham to adjoining districts during 1954-55 compared with the previous 12 months, and over a similar period an increase of 309 mill. cu.ft. of gas was received into Birmingham.

While there already exists considerable interconnection with adjoining undertakings, even greater transferability of gas is anticipated in the near future. These arrangements concern principally the Walsall Division, for direct interconnection between James Bridge (the new holder station for Walsall District) and Swan Village is planned. This interconnection in addition will ensure a better supply to consumers in Wednesbury and Darlaston and will also permit the acceptance of gas direct into the Swan Village holders from Walsall. Mainlaying schemes from the Walsall new works to Cannock and Tamworth are designed to merge with the Birmingham booster main system at Mere Green, giving further facilities for the interchange of gas.

Metering Arrangements

In affording bulk supplies to a neighbouring undertaking, the following methods of measuring gas sold are in vogue.

(1) *Inferential Metering:* This is by far the most common form adopted, in that it invariably represents a much cheaper installation than positive metering. For most low pressure fringe installations it is not possible to allow a net loss across the orifice plate of more than 1 in. W.G., and for this reason it is of the utmost importance to ensure that the duties of the installation are in practice similar to those for which it is designed. If this is not achieved, then the interpretation by the recording mechanism of the very low differential pressures across the orifice plate can give most unsatisfactory flow records. This failure to simulate design conditions in practice will lead to unsatisfactory

recording even if a substantial pressure loss at full flow is allowed.

It is usual to integrate the flow at the point of measurement, and integration by entirely mechanical means has many points in its favour. Principal among these is the elimination of the need to ventilate certain recording/integrating equipment from the point of view of safety, and as some of these installations are not too conveniently placed in relation to a supply of electricity a useful saving in installation costs can be effected. Normally a governor is included in these fringe bulk supply installations and a maximum pressure loss of some 5-10 tenths in. W.G. is usually permitted, giving not more than 15-20 tenths in. W.G. across the entire installation, including all connections.

(2) *By Aggregating the Consumers' Individual Meter Readings:* Sometimes it is convenient for the receiving undertaking to segregate a number of consumers from its supply system and, by interconnection, merge the consumer mains system with that of the supplying undertaking. These consumers need not be transferred to the supplying district. In such circumstances the registration of the gas being supplied is based upon the aggregation of the individual meter readings, plus a suitable allowance for the unaccounted-for gas figure of the receiving district. This method of bulk supply has much to commend it, in that the governing/metering costs referred to in (1) above are avoided and there is obviously no pressure loss across the installation with which to contend. The ability to adopt this means of metering is entirely governed by the layout on the receiving side. It is unlikely that the registration of gas between districts and divisions will disappear, even if there is a standardization of gas tariffs throughout the area, for one is still interested in the performance of individual districts, a feature which would be lost if registration of bulk supplies were abandoned.

District Pressures

While the Gas Act demands a minimum of 2 in. W.G. and one could, therefore, work down to this figure, such a pressure is useless in practice for the average consumer. In the Birmingham District consumer pressure averages 5 in. W.G. Below 3 in. W.G. at the inlet to the meter, many industrial consumers could not work their plant. It is quite common for an average industrial installation, incorporating service, meter and connections, and back pressure valve, to absorb 15-20 tenths in. W.G. at full flow, and as a considerable amount of industrial equipment works at 2 in. W.G., it is clear that a pressure of some 45 tenths would be essential in such an instance unless one resorted to re-boosting within the factory. The Board is not disposed towards the latter, in that incorrect selection of boosting equipment could lead to demands higher than anticipated and might react adversely on the supplies to neighbouring consumers.

The example quoted above serves to illustrate two things:—

(1) That everything should be done to induce the industrialist to size liberally his outlet pipe work, and a maximum pressure loss across a factory of not exceeding 10 tenths, and lower if practicable, is recommended.

(2) That the meters, back pressure valves and associated pipe work should also be liberally proportioned and designed on clean lines, so that friction losses are kept down to a minimum. When one realizes that gas is frequently transported several miles along low pressure mains with no more pressure loss than occurs within a matter of a few feet across a meter installation, it does, I think, suggest that everything possible should be done to cut down this installation loss.

Another interesting point is that the meter is tested to read accurately at 2 in. W.G. and 60°F. If in practice the average consumer receives gas at 5 in. W.G. and 55°F. the consumption as read at the meter is inherently inaccurate in favour of the consumer, to the extent of 1.8%. On an annual consumption of over 30,000 mill. cu.ft., this discrepancy is a significant item financially, and one wonders whether the existing testing conditions for meters could not legitimately be amended to relate more closely to the operating conditions in practice.

Governors

The governors used on the high pressure system are of the Reynolds type and differ from those in common use throughout the industry only in the following respects:—

(1) They are two-stage—*i.e.*, the pressure is broken down in two stages before it reaches district pressure.

(2) They incorporate a safety governor to avoid excessive outlet pressures on the district.

The Reynolds type district governor, with its auxiliary system and bowl, is usually employed for inlet pressures in excess of 5 lb. per sq. in. The function of the auxiliary bowl is to provide a more sensitive and powerful operation of the main governor, a vital feature where relatively high pressures and large volumes are to be dealt with.

For pressures up to 5 lb. per sq. in.—such as we encounter on our booster mains system—the operation of the main governor valves is controlled by an auxiliary system incorporating pilot governors and an inspirator. The pressure at the throat of the inspirator (which is situated between the pilot governors) is carried to the underside of the main diaphragm.

A very small quantity of gas flows through the auxiliary system. An increase in demand on the outlet of the governor has the effect of increasing the velocity through the auxiliary system, with a consequent reduction in pressure at the inspirator and in turn at the underside of the main diaphragm, thus permitting the main governor to open and rectify the pressure deficiency on the outlet.

One of the great assets of the inspirator is its ability to control closely the operation of the main governor, with very little pressure difference between inlet governor and district pressure. In our own particular installations the second stage pilot governor which controls the outlet pressure is automatically loaded to carry pressures in phase with demand. To counter possible failure of this automatically loaded pilot governor and to facilitate maintenance, a standard bypass governor in parallel with the automatically loaded governor is fitted and always left in circuit.

To avoid the formation of condensate which may affect the operating conditions on the auxiliary system, arrangements should always be made for drainage at regular intervals. It is also recommended that on all important installations a pilot safety governor be introduced between the underside of the main diaphragm and the outlet main. One can thus arrange to limit the build-up of pressure under the main diaphragm to a pre-set figure or alternatively arrange to ventilate the underside of the main diaphragm when the outlet pressure falls to a pre-determined minimum figure.

On many of our booster main governor installations the complete failure of a governor would not necessarily jeopardize the supply position on the district normally supplied from that station, for in such circumstances adjoining governor stations automatically respond to the new demand and, dependent on the capacity of the low pressure mains in the affected area, can afford substantial reinforcement of supplies.

Mainlaying Technique

Broadly speaking, the practice over the past few years has been to use flexible jointed mains for all booster and high pressure systems and to use standard open socket run lead joints for all our low pressure work. The present tendency throughout the area is to adopt flexible jointed mains for all mainlaying work.

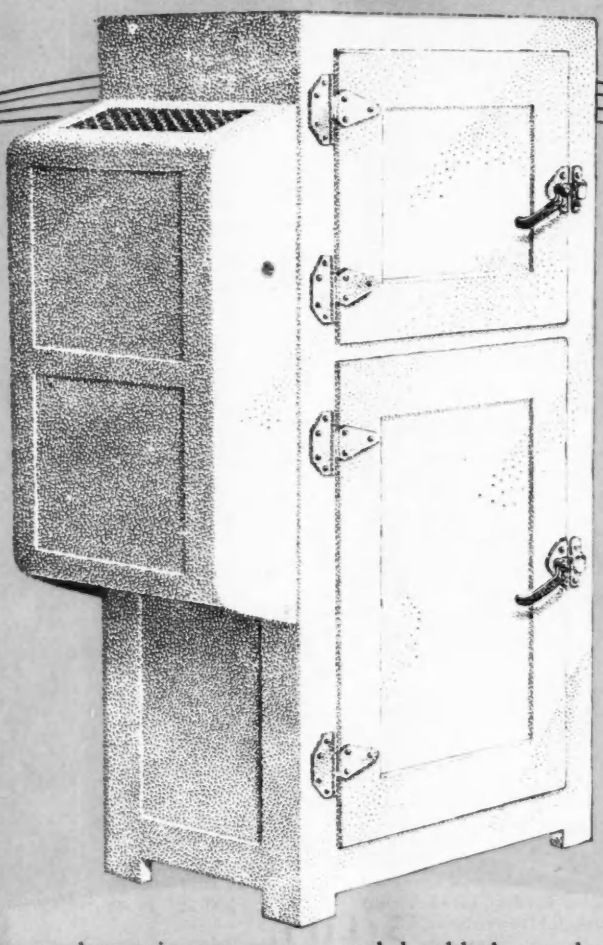
Class B spun iron pipe (either metal or sand spun) is in general use except in cases where we are likely to encounter an unusual amount of vibration or where long unsupported spans are unavoidable, in which event steel is used. This is fairly common practice throughout the gas industry, emphasis being placed on the resistance to corrosion, in which field cast iron pipe has much superior properties.

The flexible joints used in Birmingham are of the bolted gland pattern, as offered by the leading cast iron pipe manufacturers. They consist essentially of a gland assembly incorporating a rubber gasket, which is lead tipped (so that the condensate does not attack the rubber), and a metal gland ring which imparts pressure to the rubber gasket when loaded by a series of bolts of either tee-headed design (in the case of the Stanton and Clay Cross bolted glands) or hook pattern in the case of the Staveley design.

The flexible joint has won favour by virtue of its property to deflect in service while retaining a satisfactory joint assembly, and because it has always been felt that the making of the joint does not involve the craftsmanship associated with a run lead joint. Our own experience has shown that the greatest

THE PROGRESS OF GAS

1926



As late as 1922 a new—and most important—use for gas was found. Two Swedes, Karl Munters and Balthar von Platen, invented the absorption type of refrigerator.

In 1926, the first gas-operated refrigerator made its appearance in this country. Rather cumbersome in contrast to later models, because it was water-cooled and had a wooden cabinet shell, nevertheless it was a landmark in gas history.

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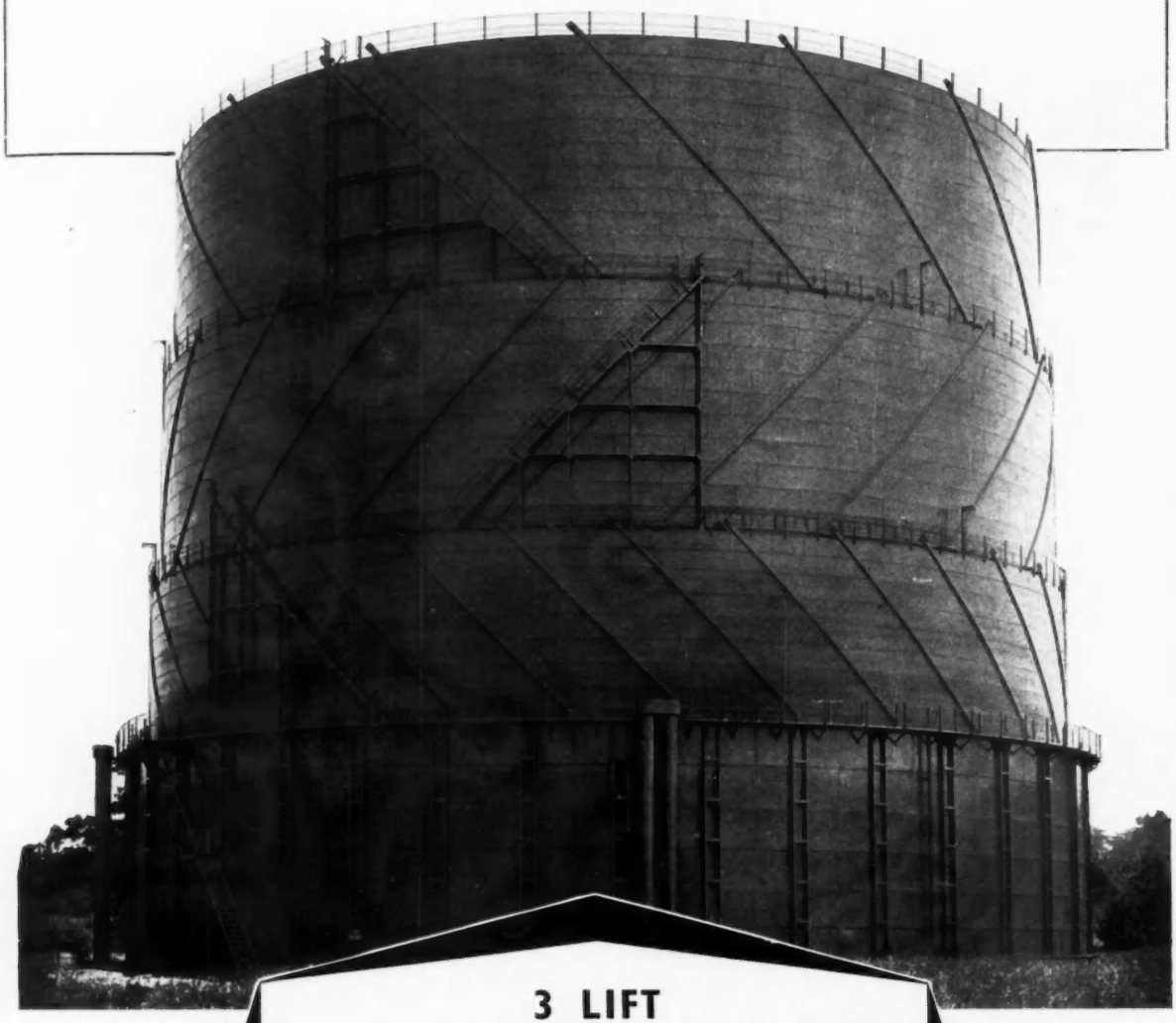

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possible care and attention should be given to the making of a flexible joint and I regard the following points as imperative:—

(1) Cleanliness of the jointing surfaces.

(2) The use of a lubricant, such as graphite (sparingly applied) or soap suds, on the rubber ring. While not regarded as essential by all manufacturers, it is our belief that this can contribute largely to the success of the joint, in that one has more assurance that the rubber is being fed forward into its correct seating position within the socket without absorbing too much effort as applied in the form of torque at the bolts, and is not, in fact, making any useful contribution towards the successful making of the joints. One must accept slight variations in manufacture, both in the diameter and section of the rubber ring and the socket profile.

(3) A concentric spigot/socket relationship when making the joint. This will involve slinging the pipe or paging in position until the joint has been made and is of particular importance when dealing with large diameters (say 12 in. and upwards). Basically the aim should be to avoid trapping the rubber by the weight of the pipe at some point short of its true bedding position. The pipe should not be deflected until the joint has been made in an 'in line' position.

(4) An even tension on the bolts. To this end we have insisted on all joints being made with a torque spanner designed to load the bolts to a figure agreed with the manufacturer. Torque loading varies from 60 to 70 ft. lb. on one design, from 75 to 80 ft. lb. on another. Our practice is to use an ordinary open-ended spanner (as supplied by the manufacturer) and then to bring the bolt tension up to the final figure by means of the torque spanner. It is doubtful whether the sequence of tightening is important, as a redistribution of stress within the rubber takes place and does not appear to be greatly influenced by the order of tightening. One usually finds that some relaxation of stress within the rubber, and consequent reduction in the torque loading of the bolts, take place some short time after the joint has been made, but this is only of the order of 5 to 10 ft. lb.

The standardization by manufacturers on die-cast bolts represents a significant advance in the design of this very important component. The tensile value of these bolts is approximately 28 tons per sq. in. and has been achieved without, so far as one knows, any marked effect upon corrosive resisting properties. This die-cast bolt provides a considerable and equally desirable factor of safety in relation to the torque loading applied to the bolt.

For normal application in the gas industry, the load to which the bolts are subjected is essentially that physically imparted by the jointer when making the joint—*i.e.*, there is very little contribution from internal loading.

It should be remembered that while the manufacturers quote a maximum deflection of 4°, this figure cannot be exploited at the time of laying if the pipe is to remain flexible in service, and in our opinion a pipe should not be deflected as laid (and after the joint has been completed in an 'in line' position) by more than 2°.

In the Birmingham District steel pipes are only used when we are required to carry mains over railways, canals, and so on, or where we anticipate a lot of vibration due to rail traffic, power hammers, blasting, *etc.*—in other wards, when one wants to exploit the characteristics of a material more elastic than cast iron.

The improved testing techniques over the past few years have focussed attention on the important problem of anchorage. While the flexible joint should, in fact, accommodate a fair degree of movement, when a pipe assembly is subjected to a resolved transverse and/or axial thrust, efforts must be made to restrain this to narrow limits, and in practice this means that one must introduce rigidity when a high degree of thrust is expected.

The anchorage required must obviously vary according to test pressure and the layout of the pipework, and the two main problems are to counter thrust at bends and at 'stunt' ends. In all cases a knowledge of subsoil behaviour is essential, and for this reason it is quite impossible to standardise dimensionally on the anchorage arrangements to be adopted. One can, however, indicate the form that the anchorage should take, and the examples below typify the alternatives available.

For strutting at caps or plugs the important points to note are:—

(a) The load must be applied to the cap over as wide an area as possible and in no circumstances must the cap be retained by propping centrally, whereby it is subjected to a punching effect.

(b) Excessive end loading of the cap should be avoided—*i.e.*, care to be exercized to ensure that no unnecessary external load is applied.

(c) The thrust block—and concrete is recommended here here for both temporary and permanent strutting—should have sufficient spread to provide a degree of bearing compatible with the surrounding soil conditions and the load to be carried.

(d) The timber selected should be well seasoned, sound and of proper dimensions.

(e) If a permanent strutting is necessary no timber should be left in—*i.e.*, the concrete should be arranged completely to shroud the cap or plug.

While it is usually a fairly simple matter to decide the thrust at bends due to internal pressure, the external loading can be very difficult to assess. Regard must be paid to thrust from buildings, etc., in the vicinity of the excavation. It may be necessary to erect retaining walls in some cases.

The more normal conditions can be met by:—

(a) Resisting the thrust on the outside arc of the bend with concrete thrust blocks. The excavation must be cut back until one is in virgin soil and can rely upon a definite resistance from this source.

(b) Resisting the thrust on the inside arc of the bend. In this application the actual weight of the concrete block is vitally important, as it must resist the over-turning load created by thrust. The main is tied back into the block by means of mild steel straps.

(c) Containing the pipe assembly within the composite raft/haunch arrangement. Steps embracing the main and fastened to the holding-down bolts provide a very satisfactory means of support. Modest reinforcement may be necessary for acute bends, particularly on the large diameters.

There is much to recommend arrangement (c), in that one contains the excavation for the anchorage within the general line of the trench and the integral raft/haunching accommodates the thrust in the best possible way. It has the advantage, too, that in built-up areas, when one frequently finds difficulty in laying on a suitable 'line,' let alone in providing anchorage, it is the most compact arrangement and is least likely to be disturbed by subsequent excavations.

Services

In 1954 a Code of Practice for the laying, maintenance and repair of services was formulated by a sub-committee of divisional distributing engineers under the direction of the Chief Distributing Engineer, and this has been adopted throughout the area. The scope of the work of the items covered is too comprehensive to record here in detail, but the following points should be of general interest.

Steel tubes and tubulars Class C (welded or seamless)	B.S. 1387
Fittings, steel and wrought iron	B.S. 1740
Pipe threads	B.S. 21
Jointing compound	B.S. 1261

All tube to be coated internally with red lead and to be protected externally with bitumen and glass fibre wrapping.

The service to be tested on site at 12 in. W.G. and the soundness of the work to be proved by a bubble tester over a period of 15 min. No loss in pressure is permitted over this period.

The service to be laid in an independent prepared duct of non-combustible material. Where the service rises vertically through the floor towards the meter position it should be surrounded by clean sand to within 1 in. of finished floor level. The ducts should be sealed at the point of entry of the service.

Where it is necessary to run the service under boarded floors (this is rarely encountered in Birmingham with present methods of construction) it is usual to shroud the service with a 2 in. tube and fill the space between the service and the tube with bitumen.

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modated in a proper duct of non-combustible material. While there have been many instances of these ducts being incorrectly placed—particularly in the case of the non-traditional types of building—very little difficulty has been experienced recently in this direction. It is important to ensure that these ducts are sealed at the entry point on completion.

Considerable economy is effected in service maintenance by using service clearing equipment. The usual technique is to disconnect the service at the inlet meter and to connect this end of the service to the vacuum tank by means of a flexible hose. By the gentle application of vacuum in association with a flexible wire which can be rotated inside the service while vacuum is being applied, it is possible to clear successfully the majority of services. By this method 1,647 services were cleared in 1954-55, representing about 60% of the total number dealt with.

Restricted services which are found to be laid under boarded floors are never dealt with by the service clearing vehicles, in case the service collapses within the premises on the application of suction. Such services are invariably renewed, as indeed are those where visual inspection suggests that clearing is undesirable.

Distribution has for a long time received serious consideration by the Birmingham undertaking. The liberally dimensioned mains referred to, the flexibility within the system and the plans for the future mean that we can deal with substantial applications for additional loads in almost any part of the District's area of supply.

Recent Developments in Gas Purification

Conclusion of the Discussion of a Paper presented by Mr. D. B. Moore, of Robert Dempster and Sons, Ltd., to the Western Junior Gas Association at Bath and printed in our issue of January 25, 1956.

After replying to a question of the subject of H_2S content, Mr. Moore continued by stating that the new pellets were very much softer than the old extracted pellets and, in view of their cost of approximately £16 per ton, their transport to the plant and into storage should receive close supervision. All pellets fed to the plant had to pass a ¼ in. mesh screen and the material passing over this screen would not create increased back pressure. The possibility of an air gas mixture being present in the airlocks had been investigated and it was intended that a small-bore pipe suitably sized should supply gas to these locks at a rate equivalent to that of the discharging pellets, although in the Factory Inspector's view this might not be strictly necessary.

Mr. J. Foxton (Cheltenham) asked whether ammonia was present as an effluent in the extraction plant, having regard to the normal practice of allowing some ammonia to pass forward to the purifiers. How did the degreasing properties of perchlorethylene affect valve lubricant and how would the plant react to the variation of H_2S content from, say, 450 gr. to 700 gr. per 100 cu.ft. which could occur in 12 hours, thus upsetting charge calculations?

Mr. Moore replied that ammonia had not, to date, created any problems in the extraction process. It might be that it helped to neutralize any HCl produced from the solvent and as the solvent passed through a packed filter, which could contain a suitable chemical, then the HCl plus any ammonia could be removed. The lubricant used for valves through which perchlorethylene passed had a glycerine base and Audco No. 631 had proved most satisfactory. A plant to deal with gas containing up to 450 or more grains of H_2S per 100 cu.ft. would consist of three towers in series. It had been found that with very strict technical control it was possible to purify this gas satisfactorily with only two towers. However, a third tower had been included to provide an adequate safety factor so that the plant did not require quite so close control as would be necessary with only two towers. In this way, variations of H_2S content on the inlet to the plant had very little effect, and as long as an average figure, that was over a period of, say, a month was allowed for, the flow of pellets could be calculated.

Mr. D. R. Jones (Bristol) commented that it had been shown that normal type boxes could work with throughputs very much in excess of rated capacity and, in view of this, he wondered if the economics of the Gastechnik plant could compare favourably. Why not use pellets in standard boxes? With regard to labour, a worker normally judged the job on the size of his pay packet, and it might be better to pay more for labour, thus increasing operating charges but not capital charges. Considerable corrosion of steel vessels might take place in regions where the air was admitted. What heat requirements were needed to prevent condensation?

Mr. Moore, in reply, said that pellets could be used in ordinary boxes and would, no doubt, improve performance, but, in his opinion, their use would not be economic. Due to the porous structure of the pellets it was only possible to work up to 30% of sulphur and this, of course, would still obtain even if the pellets were worked in boxes, whereas a normal oxide material could easily be worked up to 50% sulphur. The abrasion of the pellets would also be higher in boxes than in the Gastechnik plant, and, as the pellets were very expensive, it would seem inadvisable to use the material in boxes where normal materials could be used. No matter what they paid the worker for an objectionable job, there was still great difficulty in getting it done. Corrosion due to oxygen was not likely to be greater than with normal steel purifiers, in fact it should be less, as the proportion of air admitted was slightly less than required for normal box or tower purifiers. Indeed, corrosion was likely to be lower generally throughout the plant due to the low moisture content of the oxide material as compared with ordinary oxide. Condensation, as already explained, could produce difficulties but it was anticipated that only in cases where the inlet gas was cooled to below freezing would there be any necessity for a preheater. If it was required completely to purify gases containing only small concentrations of H_2S, then a preheater might be necessary on the inlet.

Mr. L. P. Ingram (Chief Engineer, S.W.G.B.), referring to a visit to Elland when he inspected the plant, said he was impressed by its possibilities. He was particularly interested in the ability of the plant to deal with low concentrations of H_2S while, at the same time, providing protection against sudden changes to high concentrations. It might well be that where additional purifying capacity was required considerable advantages could be obtained by installing this type of plant in conjunction with orthodox plant.

The President said how much the Association were indebted to Mr. Aspinall for arranging the meeting, to Mr. Moore, for presenting the paper, and to Robert Dempster & Sons Ltd. for providing the facilities.

Mr. E. Aspinall (Robert Dempster & Sons Ltd.), in reply, said that his firm first became interested in a Gastechnik plant in 1934 when a delegation of gas engineers from the U.K. visited Germany and inspected a plant in operation. At that time it was decided not to proceed with the system in view of the fact that the existing system of box purifiers was reliable, material was cheap and a plentiful supply of labour was available. After the war changes took place and this happy position no longer obtained, so that in 1950 development was commenced by his firm. He was convinced that towers would successfully extract H_2S in all conditions and that a bright future awaited this type of plant.

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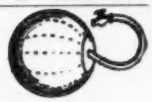
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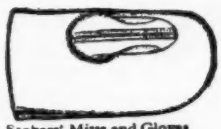
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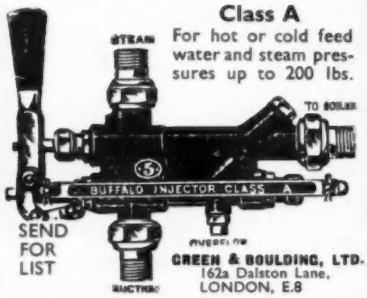

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APPOINTMENTS VACANT

The engagement of persons answering these advertisements must be made through a Local Office of the Ministry of Labour or a Scheduled Employment Agency if the applicant is a man aged 18-64 inclusive or a woman aged 18-59 inclusive unless he or she, or the employment, is excepted from the provisions of the Notification of Vacancies Order, 1952.

MEN with experience in the gas or coking industries who are willing to travel are offered good opportunities and salaries on the operating staff. Generous out living allowances and leave. Pension, Insurance and Bonus schemes. Apply with particulars of education, etc., to The Personnel Officer, Woodall-Duckham Construction Company, Ltd., 63/77, Brompton Road, London, S.W.3.

THE recently formed Heating & Ventilating Research Council require a CHIEF RESEARCH OFFICER for their new laboratories at Leatherhead. The successful applicant will be required to carry out and supervise research work on various heating and ventilating problems and collate data for use by the industries concerned. The ability to initiate and carry out research is essential, and experience of heating and ventilating industry is desirable. Starting salary £1,300-£1,500 depending on qualifications, etc. Write giving particulars to The Secretary, c/o Messrs. Andrew W. Barr & Co., 202, Bishopsgate, E.C.2.

CONSTRUCTION SUPERINTENDENT required urgently in connection with the construction of a 200 mile long natural gas pipeline with ancillaries in WEST PAKISTAN. Should be a fully qualified Engineer well experienced in the control of all aspects of large construction schemes and have sound mechanical/civil engineering experience and with a knowledge of the techniques involved in the construction of large bore welded pipelines. The period of construction will be approximately 18 months and the salary will not be less than £220 per month with free board, accommodation and medical attention. First class air passage to and from Pakistan provided but married accommodation is not available. Write, stating age, when available and giving full details of training and experience to Box GJ. 632, c/o 191, Gresham House, E.C.2.

NORTH WESTERN GAS BOARD

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INSTALLATIONS OFFICER—BARROW DISTRICT

APPLICATIONS are invited for the above pensionable appointment at a salary within Grade A.P.T. 7/8 (£620/£740 per annum).

The successful applicant will be responsible to the District Service Manager for the organisation and control of installation and maintenance staffs. Candidates should hold a qualification in Gas Engineering (Supply) and/or in Gasfitting and have had good experience in the duties required.

Detailed applications, giving the names of two referees, should reach the General Manager, N.W.G.B., Northern Group, Gas Works, St. George's Quay, Lancaster, within 14 days.

WEST MIDLANDS GAS BOARD

TECHNICAL ASSISTANT, DEVELOPMENT SECTION

A VACANCY for a TECHNICAL ASSISTANT has occurred in the Development Section, on the Industrial Gas Officer's staff, located in Birmingham.

Duties will include development work on experimental and prototype plant and tests on gas heated plant and apparatus and on process materials.

Candidates should have a comprehensive knowledge of fuel utilisation and possess qualifications in Gas Engineering, Mechanical Engineering or Fuel Technology.

The salary for the post will be within Grade 7 (£620-£700 p.a.) or 8 (£660-£740) of the National Salary Scales. The post is pensionable and the successful candidate may be required to pass a medical examination.

Applications, stating age, qualifications and experience together with the names of two referees should be sent to Industrial Relations Officer, West Midlands Gas Board, 6, Augustus Road, Edgbaston, Birmingham, 15.

J. C. INGRAM,
Secretary to the Board.

WEST MIDLANDS GAS BOARD

WOLVERHAMPTON AND DISTRICT DIVISION
WORKS MANAGER—WOLVERHAMPTON

APPLICATIONS are invited for the post of MANAGER of the above Works which has a maximum daily capacity of 16 million cubic feet. Corporate Membership of the Institution of Gas Engineers is an essential qualification.

The successful applicant will be directly responsible to the Divisional Engineer for all aspects of gas production, storage and compressing plant.

The commencing salary will be £1,600 per annum.

The post is pensionable and the successful candidate may be required to pass a medical examination.

Applications, stating age, qualifications and experience, together with the names of two referees, should be addressed to the Industrial Relations Officer, West Midlands Gas Board, 6, Augustus Road, Edgbaston, Birmingham, 15, to reach him not later than February 10, 1956.

J. C. INGRAM,
Secretary to the Board.

WEST MIDLANDS GAS BOARD

WORCESTERSHIRE—HEREFORDSHIRE DIVISION
SENIOR TECHNICAL ASSISTANT—REDDITCH GROUP

CANDIDATES must possess the Ordinary Grade Certificate (Manufacture) of the Institution of Gas Engineers as a minimum qualification and should be experienced in modern gasworks practice, including the technical control of continuous vertical retorts and carburetted water gas plants.

The salary for the post will be within Grade 6 (£565-£645 per annum) of the salary scales of the National Joint Council for Gas Staffs. The post is pensionable and the successful candidate may be required to pass a medical examination.

Applications, stating age, qualifications and experience and accompanied by the names of two referees, should be addressed to Mr. C. F. W. Rendle, Divisional General Manager, West Midlands Gas Board, Worcestershire-Herefordshire Division, Newtown Road, Worcester, to reach him not later than February 16, 1956.

J. C. INGRAM,
Secretary to the Board.

WEST MIDLANDS GAS BOARD

WOLVERHAMPTON AND DISTRICT DIVISION
DISTRICT MANAGER—WOLVERHAMPTON

APPLICATIONS are invited from suitably qualified persons for the above post which will carry with it responsibility to the Divisional General Manager for all aspects of sales and consumer service and local distribution in an undertaking with 56,000 consumers and a considerable industrial load. The duties do not include responsibility for production.

Membership of the Institution of Gas Engineers is an essential qualification.

The commencing salary will be £1,600 per annum.

The post is pensionable and the successful candidate may be required to pass a medical examination.

Applications, stating age, qualifications and experience, together with the names of two referees, should be addressed to the Industrial Relations Officer, West Midlands Gas Board, 6, Augustus Road, Edgbaston, Birmingham, 15, to reach him not later than February 10, 1956.

J. C. INGRAM,
Secretary to the Board.

WEST MIDLANDS GAS BOARD

BIRMINGHAM AND DISTRICT DIVISION
SHIFT SUPERVISOR—SWAN VILLAGE WORKS

CANDIDATES must be fully qualified to take control of the whole of the Works during periods when normal day technical staff is absent. They should have had experience in the Retort House, possess a sound working knowledge of water gas manufacture, wet and dry purification, be conversant with the operation of boosters and exhausters and also understand the operation of gasholders. Experience in controlling labour is essential.

The possession of a technical qualification such as a Certificate in the Technology of Gas Manufacture or its equivalent, will be an advantage.

The salary will be within Grade 8 (£660-£740 per annum) of the National Salary Scales for Gas Staffs. The post is pensionable and the successful candidate may be required to pass a medical examination.

Applications, stating age, personal details, particulars of training, experience and qualifications, together with the names of two referees should be addressed to Mr. J. E. Wakeford, Divisional General Manager, West Midlands Gas Board, Birmingham and District Division, Gas Offices, Edmund Street, Birmingham 3, to reach him not later than February 7, 1956.

J. C. INGRAM,
Secretary to the Board.

EASTERN GAS BOARD

(TOTTENHAM DIVISION)
CHEMIST—RESEARCH LABORATORY, WILLOUGHBY LANE WORKS

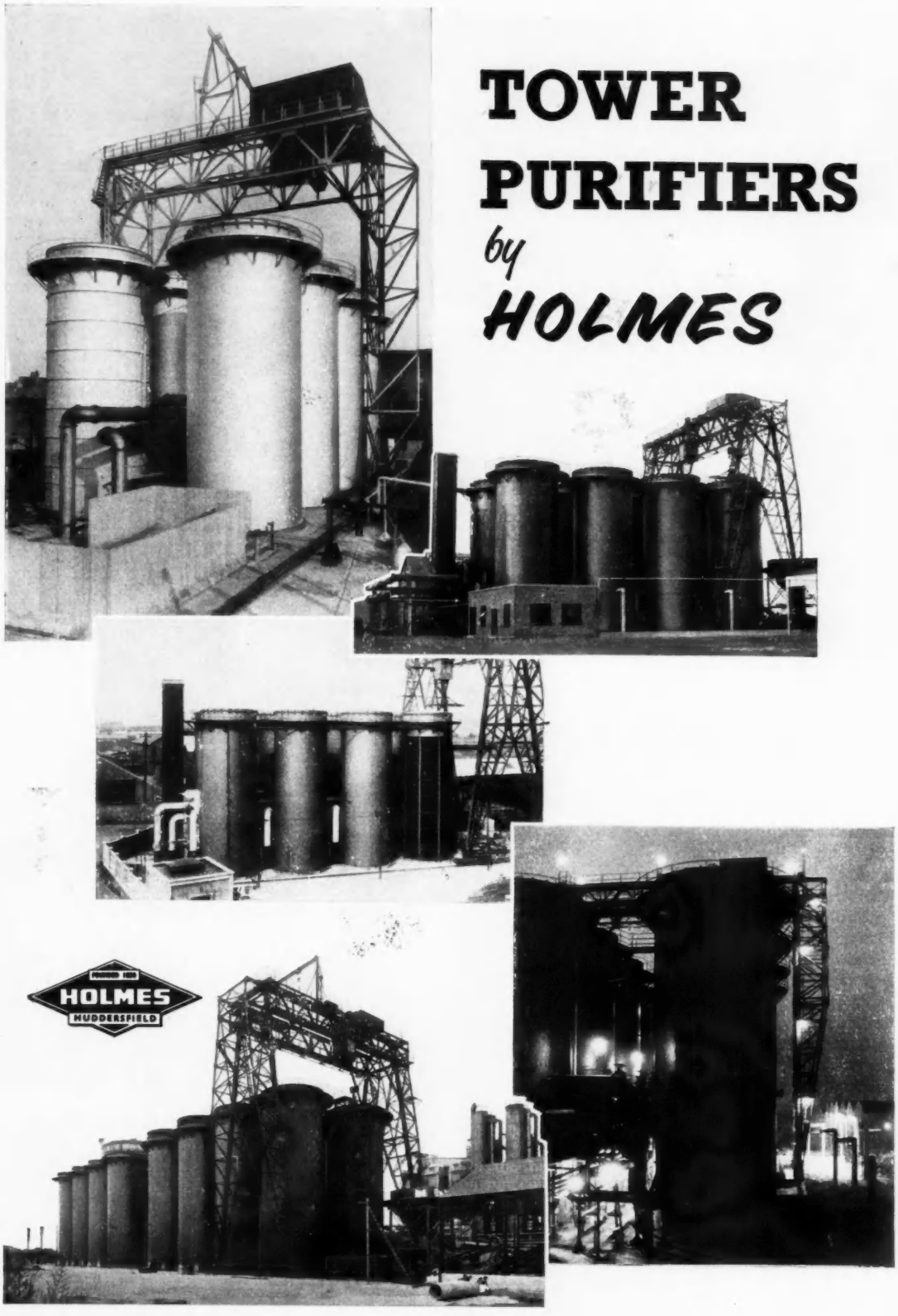
APPLICATIONS are invited for the appointment of a CHEMIST (male) in the Research Laboratory at Willoughby Lane Works.

Applicants should hold a B.Sc. Degree in Chemistry, or equivalent qualification and previous experience in the gas, fuel or heavy chemical industries will be an advantage, but is not essential. The successful applicant will be required to work under the supervision of the Research Chemist.

The salary will be in accordance with Grade A.P.T. 7 (Metropolitan) (£650-£730 per annum) of the National Salary Scales for Gas Staffs.

The successful candidate will be required to undergo a medical examination and, unless already subject to a Pension Scheme by virtue of the Gas (Pension Rights) Regulations, 1950, will be required to join the Board's Staff Pension Scheme.

Applications, stating age, education, training and experience, should be addressed to the Divisional Personnel Manager, Eastern Gas Board (Tottenham Division), Woodall House, 658, Lordship Lane, Wood Green, N.22, not later than Saturday, February 25, 1956.



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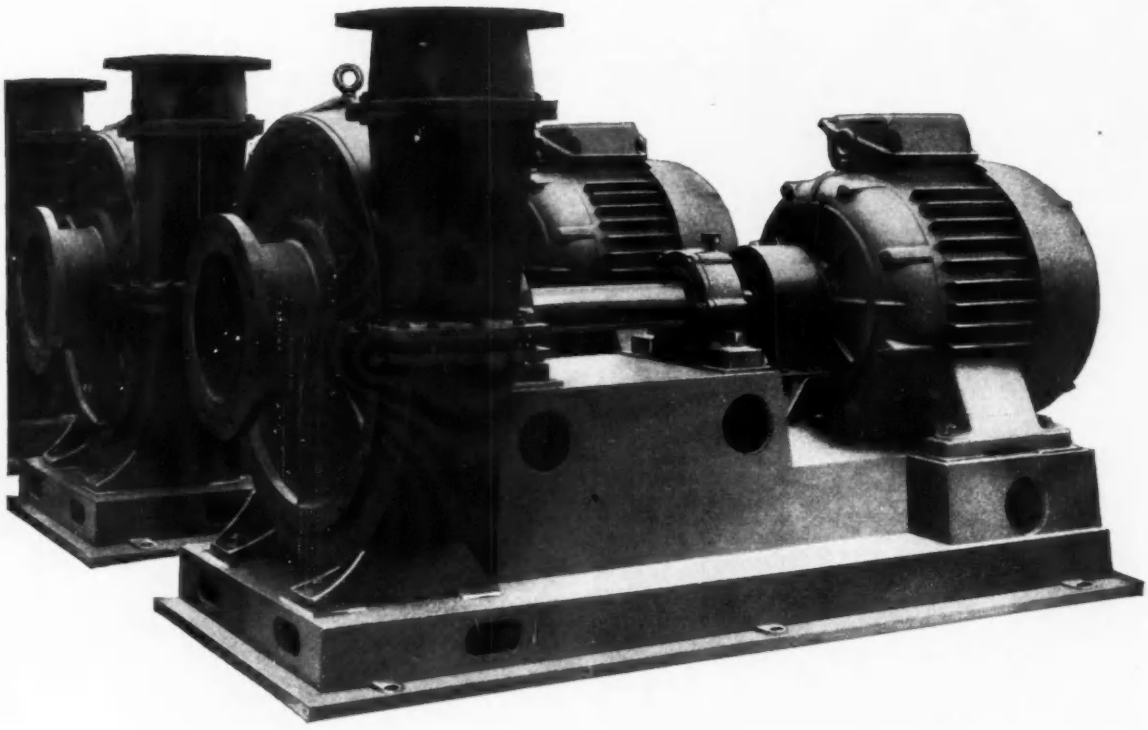

Gas Boosters?

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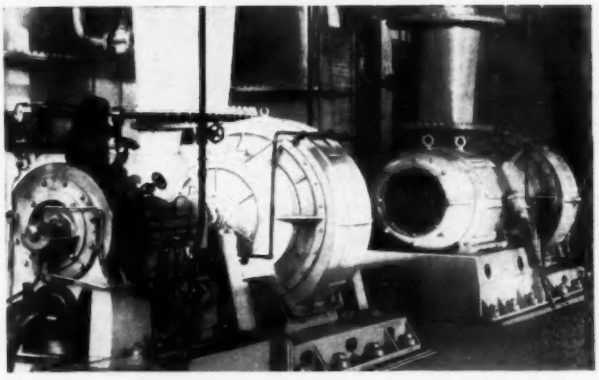

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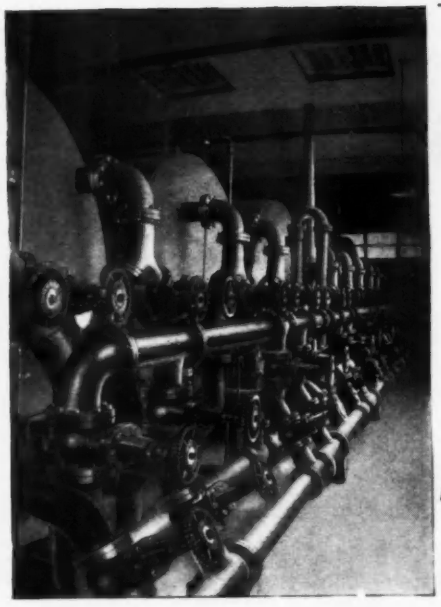
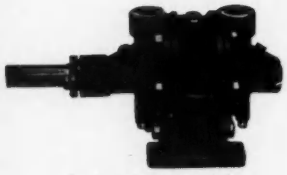


Filtration Plant



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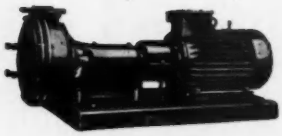
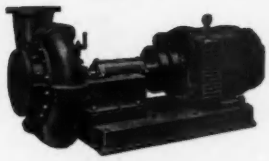
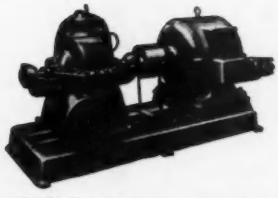


Stoneware pump for Corrosive and chemicals



Slurry pump for coal washing and abrasive liquids.



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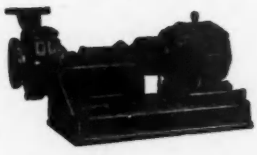
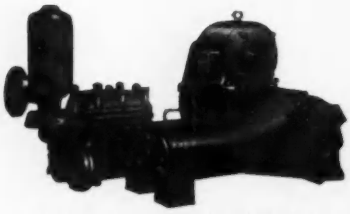
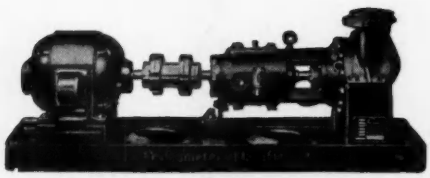


"JA" & "JB" types for high temperature water circulation.

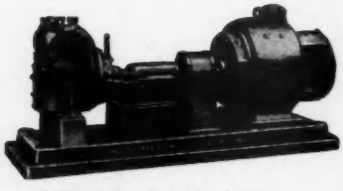
The illustrations show centrifugal pumps for light and heavy oil and liquor duties, stoneware and special metal pumps for handling acids and alkalis, pumps for circulating and washer duties, for clean water and fire services and for liquids containing abrasives.



Reciprocating pump of modern design for Gas Works.



Pulsometer—Pacific type, based on latest American practice.



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